Southwestern Medicine

OFFICIAL ORGAN OF
ARIZONA STATE MEDICAL ASSOCIATION
NEW MEXICO MEDICAL SOCIETY
EL PASO COUNTY (TEXAS) MEDICAL SOCIETY
THE MEDICAL AND SURGICAL ASSOCIATION
OF THE SOUTHWEST

VOL. XVI. JULY, 1932 No. 7

ANNUAL SUBSCRIPTION $2 SINGLE COPIES 25 CENTS

Entered at the Postoffice at Phoenix, Arizona, as second class matter.
"Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized March 1, 1921."

URETHRAL METHODS FOR THE RELIEF OF PROSTATIC OBSTRUCTION

HISTORY AND PRESENT STATUS

By DAVID M. DAVIS, M. D.
Phoenix, Ariz.

(Read before the Forty-First Annual Meeting of the Arizona State Medical Association, held at Globe, Ariz., April 21-23, 1932.)

It is difficult to say exactly when the history of intra-urethral methods of relieving prostatic obstruction begins. It was only about 150 years ago that physicians, generally, began to gain any adequate conception of the pathology and natural history of prostatic obstruction. The first operative cure of prostatic obstruction must have been performed by some ancient lithotomist, who seized with his forceps a projecting median lobe, thinking it to be a stone. Fullerton states that Covillard did this in 1639. It was, however, generally considered a very poor thing to do, because of subsequent hemorrhage. In France, however, Amussat, in 1827 had the courage to remove such a lobe purposely with scissors through a perineal opening, and from experience Nicod suggested the possibility of removing such a lobe by means of a large catheter with a large eye, the edge of which was sharpened. I can not make sure whether this was ever actually done or not, but it may serve as the first suggestion of a real intra-urethral method.

Apparently this idea attracted a good many physicians at the time. About 1835 or 1840, Leroy d' Etiolles presented a most ingenious instrument. It consisted of a metal sound constructed in halves. When rotated, the halves of the curved end separated within the bladder carrying with them a wire snare. This made it possible to place the snare about the root of a pedunculated median lobe. This instrument was seldom, if ever, used.

There was much discussion at this time as to whether the bladder became paralyzed in these cases, or whether it could resume its function after the removal of the obstruction. Guthrie in England published an excellent article in 1834, contending correctly that obstruction was the whole story. To meet this situation, he devised an instrument similar to an internal urethrotome, with which he proposed to cut open the vesical orifice. This procedure was, of course, entirely insufficient in most cases, although he had a few good results.

From 1839 to 1852, the great French urologist, Mercier, devised a half-dozen different instruments for the same purpose. Some of these had cutting blades similar to Guthrie's but more effective; while another had a circular cutting blade—the progenitor of the Young punch. These instruments, however, were all small and had only a limited usefulness.

With the development of knowledge concerning electricity, Bottini in 1876 modified one of Mercier's cutting instruments by replacing the cutting blade with a galvano-cautery. This instrument was later improved by Freudenberg and Young and became very popular. With it, large portions of the prostate could be burned away or separated and many cases were cured. The large amount of slough, however, produced many infectious complications and it was easy to burn too far, so that the blade entered the rectum or injured the prevesical plexus of veins, causing fatal hemorrhage. As a result of this, the Bottini operation finally fell into disfavor and prostatectomy became the procedure of choice.

In 1909, Young of Baltimore, who had noticed that in certain cases the amount of tissue which had to be removed to relieve the obstruction was very small, returned to the intra-urethral method and constructed his punch instrument. This instrument was larger than Mercier's and with it generous pieces could be removed, making it possible to cure many cases of median-bar obstruction and obstruction due to small or moderate-sized median lobes. Hemor-

rhage was the greatest drawback to the method. In 1911, Young modified the instrument by replacing the cutting edge of the blade with a circular electro-cautery blade. In 1920, Caulk of St. Louis produced independently a very similar instrument. With this instrument, hemorrhage was completely overcome, but the infectious complications previously noted with the Bottini instrument, reappeared. In 1917, Hinman of San Francisco began the practice of inserting a cystoscope after the punch operation was completed, observing the bleeding points and arresting each one individually by electro-coagulation with a flexible electrode. While he had great success with this method, he never formally published it, and it was rediscovered independently by Bumpus of Rochester, Minn., in 1926. Special instruments to make this procedure easier were invented by Day of Los Angeles and McCarthy of New York. So modernized the punch operation became a highly successful and satisfactory method of dealing with prostatic obstructions in cases where the amount of tissue was small.

My own contribution took the form of a punch instrument made with a long beak, equipped with a flexible wire, allowing the orifice to be drawn up into the notch of the punch, so that larger pieces could be excised. With all instruments of this nature, however, the amount of tissue which could be removed was strictly limited, and they afforded no help in the attack upon the greatly enlarged prostate.

In 1913, Stevens of New York suggested the destruction of large prostatic lobes by the simple application of electro-coagulation. This was a modernized Bottini operation done under vision. With it, however, came again the disadvantages due to the large masses of necrotic tissue left behind. In 1914, Luys of France published a similar method, in which he used gouged-shaped galvano-cautery blades for removing pieces of the lateral and median lobes, and electro-coagulation for stopping hemorrhage. Heitz-Boyer of Paris also employed a similar method, but in this country it found no favor.

Shortly after the World War, the electrical technicians discovered the undamped electrical current, which, it was found, would cut tissue with a minimum of destruction. Maximilian Stern of New York was quick to seize upon the importance of this discovery for intra-urethral procedures and constructed an instrument which he called the "resectoscope." This instrument had a small movable wire loop with which small cylindrical segments could be removed from the prostate under vision. It functioned very successfully as far as the cutting was concerned, but it was soon found that the cutting current produced such a shallow coagulation that hemorrhage occurred almost as freely as though one had used a knife, and the instrument, therefore, remained as a mere novelty.

Shortly afterwards, Collings of New York, simplified the procedure by using a simple angulated knife-like electrode for the application of the cutting current. He moved this rapidly back and forth through the prostatic tissue, literally destroying it. He was able to treat many cases successfully, but the difficulties with hemorrhage were still present.

Theodore Davis of Greenville, South Carolina, had obtained a Stern resectoscope. The ease with which the enlarged prostate could be whittled away with this instrument fascinated him and he realized that, if he could apply at will through the wire loop a coagulation current for stopping such hemorrhage as might occur, the method would become ideal. The technical difficulties facing him proved to be very great, but, spurred on by enthusiasm, he labored in the semi-obscurity of his small southern city until all difficulties were finally overcome. He found that he was now freed from the limitations of the punch instrument, and that with this loop he could cut away as much as might be necessary of the lateral or median lobes, stopping the hemorrhage easily as he went along. He gained much experience before the medical world in general became aware of his work, and found that he was able to remove as much as 35 grams of tissue from a single individual. At first the results were received with skepticism, but he soon demonstrated the value of his instrument, and it took the urological world by storm.

Fired by his success, McCarthy of New York modified his pan-endoscope in such a manner that a loop similar to that used by Davis could be used in it, and with this instrument results exactly similar to those of Davis can be obtained. The only difference is that with the Davis instrument one cuts toward the bladder, while with the McCarthy instrument one cuts from within the bladder outward. Vision is unobstructed at all times and one can remove exactly as much or as little as he wishes.

Tremendous enthusiasm has been created by the advent of these two instruments, so much so that papers have already been published with such sensational titles as "Is Prostatectomy Doomed?" Enthusiasm must, however, be curbed until more experience has been gained. Prostatic resection has al-

ready led a number of urologists into tragic mistakes. Carried away by enthusiasm, they have operated, without proper preparation, upon patients with severe and long-standing obstructions, causing death from uremia and sepsis, and, unfamiliar with the instruments, they have cut away portions of the external sphincter, leading to incontinence; burned the bladder, causing extravasation of urine; and damaged the ureters, giving rise to ascending pyelonephritis. On the other hand, others who have practised until they are perfectly familiar with the instruments and who have prepared their patients just as carefully as they would for regular prostatotomy, have duplicated the success of Davis. Even from a conservative point of view, it would appear that all cases of prostatic obstruction in which the prostate is small or of moderate size, can be successfully treated by this method, regardless of whether the obstruction is due to median bar, contracture of the orifice, benign hypertrophy, or carcinoma. Apparently some of the largest prostates would require such lengthy operations with the resecting instruments that prostatectomy is preferable. The exact size which makes resection unprofitable remains to be determined, but it is probably quite large.

My own experiences with prostatic resection have been uniformly successful. None of the patients has had to remain in the hospital more than four days after the operation, most of them leaving in two days. I have not yet operated upon any very large prostates, but these specimens will demonstrate that it is possible to remove a very considerable quantity of tissue by this method.

DISCUSSION

DR. H. M. PURCELL (Phoenix): I have had no personal experience with the resectoscope on patients, as I received the last of my outfit—the coagulating part of the machine—only two days ago. But I believe it will practically do away with prostatectomy.

I prefer the McCarthy instrument (resectoscope) because it gives better vision than the Sterns type.

It is not necessary to remove all the enlargement. Removal of a very small portion will often relieve the obstruction, even in cases with a large amount of residual urine. The enlargement is as much due to congestion due to the obstruction as to true hypertrophied tissue. Removing the obstructing portion allows the prostate to become smaller. I remember one case I had, with complete obstruction and several pints residual urine, that showed a large prostate on examination per rectum. I did a suprapubic drainage and, when the patient was in condition, in about two weeks, I did the second stage without again examining the prostate per rectum. I found that the prostate had become practically normal in size and I was able to remove only a piece the size of the end of the little finger from the median lobe region.

I believe the method is going to replace prostatectomy in practically all cases. I believe in the future we will not see the advanced cases, because we will operate earlier and the patients will be willing to come to us earlier.

There is a greater percentage of cures by this method than by prostatectomy. T. M. Davis of Greenville, S. C., who is the only man with five years' experience with resection, puts it at 23 to 1 in favor of resection.

As to the amount of tissue that has been removed, Davis of South Carolina reports as high as 40 grams in a single case. It has been said that a necessity is a "strong back and a strong determination," some of the first cases reported taking as long as two hours. But with the present improved instruments larger sections can be taken and the time required is shortened.

We must prepare the patient the same way that we would a case for prostatectomy. A patient with a large residual and who has never been catheterized, would be a poor risk and must be decompressed as for a prostatectomy.

As to the dangers, they can be avoided if we are careful. The postoperative pyelonephritis is due to burning the region of the ureters and can be avoided. And there is no reason why we should cut the external sphincter, as the vera montanum should be our guide as to how far to cut.

As to the electric machine, there are two types on the market—that using a vacuum tube, as the McCarthy unit of the Comprex Oscillator Co., and the spark gap, as the Liebel-Flarsheim machine. The McCarthy machine gives the true so-called "undamped' wave, which cuts most easily, but does not give enough hemostasis. It takes a different type of current to stop hemorrhage—the kind found in diathermy machines and known as a "damped" wave. The Liebel-Flarsheim machine has both a cutting, slightly damped, wave, and a hemostatic type of current. In the McCarthy machine a double foot switch merely reduces the current strength so it will not cut, when we want to stop bleeding. In the literature, such men as Day of Los Angeles, Livermore of Memphis, and McCarthy, all speak of the McCarthy machine as a "perfect" machine, but they are apparently afraid of hemorrhage; but the men with the Liebel-Flarsheim type of machine do not mind the hemorrhage, as they have complete control of it.

This method is also applicable to malignancies, and Caulk reports relief of obstruction and much better life expectancy in cases treated by resection than by prostatectomy.

DR. W. G. SCHULTZ (Tucson): Two years ago I read a similar paper before our state meeting at Prescott, in which I brought the discussion of instruments for handling bladder-neck obstructions down through the Collings electrotome.

We now have the resectotome which combines all

of the principles for which former instruments were being designed, viz: First, good vision at all times; second, control of primary hemorrhage; and, third, small amount of coagulated tissue, minimum slough, producing less infection, fewer pyelitis complications and fewer cases of secondary hemorrhage.

The instrument permits an excellent means of handling median bars and, in addition, also gives us an effective way of removing lateral lobes.

Of course, we hope to do away entirely with prostatectomies by the use of this instrument, but their number will be greatly reduced and a very great number of the cases formerly operated by means of prostatectomy will now be handled with the resectotome, saving much time in hospitalization, and so forth.

DR. O. E. UTZINGER (Superior): For a great many years, efforts have been made to get away from prostatectomy for the relief of urinary obstruction. Dr. Hugh H. Young's punch operation was probably the first important step in this direction, but, for a long time following its introduction, not much progress was made. Several urologists, however, have been at work perfecting and using the resectoscope, as has been so clearly shown by this paper presented by Dr. Davis. Here at last we have a method that will, in a large percentage of cases of prostatic obstruction, give complete relief, and by a much less drastic operation than prostatectomy.

Dr. Davis has sounded a timely warning against over enthusiasm by the urologist, and a caution for the same care in the study and preparation of the patient that is practised preceding prostatectomy.

DR. D. F. HARBRIDGE (Phoenix): I should like to ask Dr. Davis whether he uses a local or a general anesthetic.

DR. DAVIS (closing): Transacral nerve block is entirely satisfactory for these cases. With proper preliminary medication, it is successful in practically 100 per cent of the occasions. A low spinal anesthesia can be used, but it is unnecessary, and I, personally, have a prejudice against spinal anesthesia. Explosive anesthetics must, of course, be avoided.

HEART MURMURS

W. PAUL HOLBROOK, M. D.
Desert Sanatorium and Institute of Research,
Tucson, Arizona

(Read before the Forty-First Annual Meeting of the Arizona State Medical Association, held at Globe, Ariz., April 21-23, 1932.)

So much confusion has been present for centuries regarding the functions of the heart and blood vessels that I venture on the subject of heart murmurs with some timidity. Heart murmurs, we now know, are dependent upon the circulation. It may seem incredible to us, but it was not until William Harvey, in 1628, published his famous experiments, that the circulation of the blood was recognized. Anatomists, scientists, and physicians had for centuries sought in vain the solution of three puzzling problems: the function of the blood, the purpose and mechanism of respiration, and the source of bodily heat. The origin of the term "artery"—"air carrying"—gives us a good idea of early concepts.

Aristotle, contrary to the common opinion, recognized perfectly the existence of venous and arterial blood, as well as the pulsations of the heart and blood vessels. These pulsations were believed to be synchronous, and, because his dissections and those of other anatomists did not reveal any connecting channel between the right and the left side of the heart, nor between the arteries and veins, he assumed them to be separate systems. Aristotle believed that the blood must move with a slow, tide-like motion for the exchange of substances between the blood and tissues. It was the function of the venous blood to collect the nutriment from the intestines and carry it to the liver, where vital and natural spirits were elaborated, and then it was carried on to bathe the tissues in the venous system. The arterial blood also moved in a slow, tidal fashion. Its function was to convey to the tissues pneuma, which was a vital spirit (air) obtained from the lungs, and to carry to the body heat, which it was thought was produced and stored by the heart itself.

To this concept of the circulation, Galen, six hundred years later, added the suggestion that the liver perhaps was the center of the vascular system, and not the heart. It is said that, by observing an animal bleed to death following arterial section, which emptied veins as well as arteries, he became convinced that there must be some connection between the arterial and venous systems. Anatomical dissections did not confirm his belief, so, to satisfy his reasoning he proposed the existence of pores through the ventricular septum and a probable connection as well between the peripheral arterial and venous systems. For fourteen hundred years after Galen, very little construction work was done, and it was this concept of the vascular system that Harvey was taught as a student.

There were still bitter arguments as to the relative merits of the Aristotelian and Galenic theories when Harvey began his experiments. Harvey's experiments were so simple and so spectacular that I cannot resist mentioning some of them. It is said that, during his dissections, he observed that the valves in the veins were so arranged that blood could flow freely toward

the heart, but with great difficulty in the opposite direction. He at once performed the simple experiment of tying a tourniquet tightly about the arm. He observed that the arterial pulsations ceased and that the tissue above the tourniquet became congested. He loosened the tourniquet slightly so that the arterial pulsations could be felt at the wrist, and, much to his joy, the veins below the tourniquet immediately became distended with blood, and "knots," the valves, stood out along the course of the obstructed veins, thus suggesting strongly that the blood traveled from the heart through the arteries and toward the heart in the veins.

While watching a dog's heart at operation, he observed, much to his amazement, that it was not during diastole, but during systole, that the apex of the heart struck the chest wall, and that during this period the heart became much smaller. Here, then, was the proof that the heart and blood vessels did not pulsate synchronously, but when the heart became smaller, the arteries dilated. He soon calculated the amount of blood forced out of the left ventricle at each contraction. Estimated on the basis of half an hour, more blood was pumped from the left ventricle than the entire body contained, thus proving conclusively that the blood must circulate. Harvey inherited a heart that did not beat, a vascular system that was disorganized, pores in the intraventricular system which did not exist, as well as a host of other disordered observations. In a few simple experiments he brought the entire mechanism into harmony, and his work is the basis for all our modern physiology of circulation.

It is interesting to note that murmurs were often heard by the ancient physicians. Hypocrates makes notes of such findings without offering adequate explanations. Empedocles, when seeing a patient who, from the description, must have had an aortic stenosis, judging by the intensity of the murmur is said to have remarked, "Surely this unhappy mortal is possessed by the very prince of evil spirits!"

The physiology and physics of the circulation offer us a satisfactory explanation for many circulatory phenomena. I wish to mention briefly a few of the factors concerned in the mechanism of the production of heart murmurs. Because systolic murmurs are the most frequent, and perhaps least understood, this discussion will be limited to their consideration.

Schlieps, in Germany, and Thayer in this country, in examining a total of two thousand patients, have recorded a frequency of systolic murmurs that averages as follows: 60 per cent in children from six to fourteen years; 35 per cent from ten to twenty; 22 per cent from twenty to thirty, and 19 per cent from thirty to forty. The incidence, you will note, is very high. It is probable that a great proportion of cardiac consultations are because of systolic murmur, and many people with normal hearts are condemned to invalidism because of a systolic murmur.

A murmur is a sound produced, when fluid passes through a tube, by vibrations set up in the walls of the tube. The intensity of the sound produced is directly proportional to the square of the amplitude of the vibrations. It follows that thick or rigid walls reduce the intensity of sound because of the reduced amplitude of vibration. Vibration in the walls of the vascular channels is developed only when the motion of fluid particles becomes turbulent. So long as the fluid particles run perfectly parallel, no turbulence occurs and no sound is produced. When the particles of fluid no longer flow in parallel lines, turbulence occurs; with turbulence, the walls of the vascular channels vibrate and, if the vibration is sufficient, sound is produced. Turbulence may be produced in several ways. The passage of fluid from a narrow tube to a larger one, or vice versa, may produce turbulence. The flow of fluid over a partial obstruction in the channels may produce turbulence. If the speed of the flow is greater than the critical velocity, turbulence will occur. The critical velocity may be defined as that speed at which any fluid will no longer run quietly in parallel lines but becomes turbulent. This factor is an important one in the production of systolic murmur. It has been calculated from Reynold's formula that the velocity of the blood as it enters the aorta and pulmonary artery is very near the critical velocity for blood. Fahr, at the University of Minnesota, in his excellent work on Heart Physiology, has confirmed this by an experiment with a Starling heart-lung preparation, where turbulence can be seen in the glass tube. We have, then, a normal velocity of blood at the aortic and pulmonic areas which is near the critical velocity, i. e., a slight increase in the speed of flow at these areas will then produce turbulence and murmur. The murmur will be systolic in time because the blood reaches its highest velocity during systole. Many other factors influence critical velocity. Changes in viscosity or anemia may reduce the critical velocity to the point where murmurs occur without actual increase in velocity. Exercise, and fever, and many other conditions, may increase the velocity sufficiently to produce turbulence and murmur. Any irregularity in the channel may produce

turbulence and murmur. Thayer and MacCallum[1] have shown that murmurs are produced in dogs if the stethoscope is held over the pulmonary artery and aorta with the slightest pressure. The normal mitral valve may not close sufficiently tight in systole to prevent some slight flow between the cusps. A very small irregularity on the valve may produce a very loud murmur. These are a few of the simple mechanisms by which systloic murmurs may be produced in the absence of organic heart disease, and usually in perfectly normal individuals. The frequency of systolic murmurs in hyperthyroidism is an excellent illustration of a murmur produced by increased velocity of blood. The anxiety of the patient during physical examination may often produce murmur. The three most common areas in which one hears a systolic murmur are the pulmonary, aortic, and mitral areas.

Systolic murmurs heard best in the left second and third interspaces (pulmonic area) are the most frequent in occurrence of all systolic murmurs. The blood exceeding the critical velocity is a frequent explanation of systolic murmurs in this area. The shape of the chest is important, as I have repeatedly found on fluoroscopy in adults who have had such systolic murmurs. The chest if often flat, and the pulmonary cone in nearly every instance was noted to be almost against the sternum, which produced a slight distortion of the cone on systole, thus producing murmur. Querner[2] has shown that practically no lung tissue exists, in these flat-chested individuals, between the sternum and the conum pulmonus. The thinness of the blood vessel walls is one explanation for the great frequency of systolic murmurs in children and in young adults, for the elasticity and width of vibration decrease with age. One only needs to rule out a pulmonary stenosis or a congenital malformation of the heart, to be sure that this murmur is functional and due to one of the above-mentioned factors.

Systolic murmurs heard over the right second interspace (aortic area) may, in general, be analyzed in the same way. The speed of the blood is here, again, near the critical velocity, so that excitement, fever, and many other things may produce murmur. Senile ectasia of the aorta provides a sudden change in diameter of the tube which may produce turbulence and murmur. One needs here only to rule out aortic stenosis. Aortic insufficiency often accompanies stenosis; therefore, one must carefully examine for a diastolic murmur down the left side of the sternum. If in addition there is no pulsus tardus, no thrill, and a normal pulse pressure, aortic stenosis is not present.

The third common area in which systolic murmurs are heard frequently, is at the apex, or just inside the nipple line. Systolic murmurs heard here are often transmitted from the pulmonary area. They may be cardio-respiratory or postural, or the cusps of the mitral valve may show some slight irregularity and produce murmur under the pressure of systole. Mitral insufficiency is undoubtedly diagnosed much too frequently in accounting for an apical systolic murmur. Mitral insufficiency alone is not of any serious import. As Steele so aptly put it, "No one ever dies from mitral insufficiency." With a murmur in this area, the question of mitral stenosis must be raised. If there is no diastolic murmur, if the esophagogram is normal, if the vital capacity is normal, and if the orthodiagram does not show abnormalities in size or shape, one can be sure that no mitral stenosis exists. In patients who have recently had an acute febrile illness, such as rheumatic fever or acute tonsillitis, a systolic murmur at the apex is presumptively on an organic basis and should be viewed with suspicion for at least two years, during which time frequent examinations should be made for a developing mitral stenosis. Judgment often cannot be passed until a year or two has elapsed, and if, at the end of this time, no additional manifestations have become evident, the murmur can safely be classed as functional.

All patients suspected of heart lesions should be carefully evaluated for changes in the size of the heart—best done with an orthodiascope or a six-foot x-ray of the heart—changes in vital capacity, with careful examination for diastolic murmurs, electrocardiogram, and an esophagogram made to observe the posterior contour of the heart. Riegler[3] has pointed out the very high incidence in which mitral stenosis can be definitely diagnosed by the esophagogram. All possible criteria should be evaluated, but, in the absence of definite positive findings, we should recognize that systolic murmurs are in general functional in character and easily produced in normal individuals by the various mechanisms described.

REFERENCES

1. Thayer and MacCullum: American Journal of Med. Sciences, 1907, 133, 249.
2. Querner: Muench Med. Woch, 1917, 44, 721.
3. Riegler: American Journ. Roentgenology and Radium Therapy, 1929, 21, 563.

DISCUSSION

DR. HOWELL RANDOLPH (Phoenix): Evaluation of systolic murmurs is not always easy. With the explanation gievn in Dr. Holbrook's scholarly

paper in mind, it should be made more simple. The rate of blood flow through the tube being an important factor in the production of murmurs, it is readily understood why a normal individual who does not show any systolic murmur at rest, will sometimes develop a systolic murmur after exercise. I have in mind a case in whom exertion brought out both presystolic and systolic murmurs of diagnostic significance. A young man desiring to extend his service connection disability came in to establish the status of his cardiac condition. Following an attack of influenza during the war, he was disabled for three weeks, after which he was put on light duty for the duration of the war. At time of discharge no disability was noted. He gives a history of having had some signs of decompensation at intervals in the interim, which must be discounted on account of that purpose for which the history was given. Examination revealed slight cardiac enlargement to percussion, definite enlargement under the fluoroscope, and left ventricular preponderance in the electrocardiogram. No murmurs were audible until after exercise, when presystolic and systolic mitral murmurs were heard.

DR. H. E. REESE (Yuma): I examine hundreds of school children every year and am surprised at the number of heart murmurs I have to record. Where the murmur is increased by exercise, I usually caution the teacher not to put the child into strenuous exercise. I should like to ask Dr. Holbrook's opinion as to whether I am wrong in limiting the amount of exercise.

DR. L. B. BALDWIN (Phoenix): I am interested in the diastolic murmurs heard over the aortic area in severe primary and secondary anemias, in which no organic basis can be found for the murmurs. So far as I know, no explanation has been given for them, although they have been reported in the literature. I should like very much to hear your impressions of these murmurs and an explanation of their cause.

DR. HOLBROOK (closing): In reply to Dr. Randolph's question, I should say that it is not the systolic murmur, but the pre-systolic one brought out on exercise, that is important. This murmur is often brought out by exercise and I find the use of amyl nitrite very helpful, where patients cannot exercise, in bringing out diastolic murmurs.

In regard to Dr. Reese's question, 60 per cent of children have systolic murmurs from six to fourteen years of age; 35 per cent from ten to twenty; 22 per cent from twenty to thirty, and 19 per cent from thirty to forty. The murmur is due to the speed of blood flow in children, the thinness of the blood vessel walls, and the relative flatness of their chests, which brings the blood vessels nearer the sternum. Is Dr. Reese doing wrong in curtailing the activities of children who have systolic murmurs? I feel that, if the child is physically normal, has no heart enlargement, and no embarrassment with exercise, a systolic murmur alone should not prevent the child from exercising.

Regarding Dr. Baldwin's question as to the relation between structure and function, I believe that aortic insufficiency may be due in some cases to a slight dilatation of the ring, as may occur in early lues, and, though one distinctly hears a diastolic murmur, no definite pathological signs may be demonstrable on postmortem. I have had several such experiences but believe that the clear-cut diastolic murmur down the left side of the sternum indicates aortic insufficiency, though it may be unimportant physiologically and difficult to explain pathologically.

DELAYED TRAUMATIC SUBDURAL BLEEDING

WITH CASE REPORTS

DORRELL G. DICKERSON, M. D., F. A. C. S.
Seattle, Washington

Delayed subdural bleeding, until recent years, has seldom been recognized and oftentimes confused with a rare form of pachymeningitis hemorrhagica interna.. Virchow[1], in 1857, gave the first classical description of chronic subdural hemorrhage. Trotter[2], Putnam[3], Cushing, Griswold, Jelsma[4] and others have, in the last decade, contributed much information to this subject. In 1925 Putnam and Cushing reported twelve cases. Jelsma in 1930 reported forty-two cases from the literature and two personal observations. During the last few years, numerous case reports and contributions on the subject have appeared in the literature. This information and clinical investigation has given a special interest to the subject and today chronic subdural hematoma is definitely recognized as a pathological entity.

Ingravescent subdural bleeding is invariably due to craniocerebral trauma. A history of injury or violence to the head may be wanting, or so trivial as to escape the memory of the patient. The injury may be so slight that there is no visible bruising or abrasion of the scalp[5]. A history of a smart blow on the head or occiput, or a glancing blow over the vertex, is frequently given. In many cases the injury does not produce loss of consciousness. At most, these patients suffer only a brief period of concussion. They promptly recover from the immediate effects of the blow and resume their activities without apparent disability. More often than not, the incident is entirely forgotten. Delayed subdural bleeding is occasionally encountered in the alcoholic, senile dement, and those suffering from dementia paralytica. Mild head trauma with subsequent development of a spreading subdural hemorrhage, is sometimes found

at postmortem in these individuals, not known to have received a head injury.

In order to understand thoroughly the mechanism of this particular type of delayed subdural hemorrhage, we should first review the gross anatomy of the intracranial contents. Anatomically the brain may be considered as floating on a bed of cerebrospinal fluid and restricted in its motion by the limitations of the dura and its partitions within the cranial cavity. The brain, therefore, is allowed a certain amount of "play." There are small anastamotic vessels connecting the cortical veins near the vertex with the superior longitudinal sinus. These run at right angles and move with the lateral "to-an-fro" and backward-and-forward movements of the brain on its bed. Any sudden violence or jarring of the cerebrum beyond its normal confines places an unusual strain on these short veins and may produce a unilateral or bilateral tear in this system. The fixed position of the superior longitudinal sinus and the mobility of the cerebral hemispheres often lead to the laceration of these small veins. Undoubtedly there are other sources of bleeding in such cases of chronic subdural hemorrhage, but this is the usual source. (Fig. 1.)

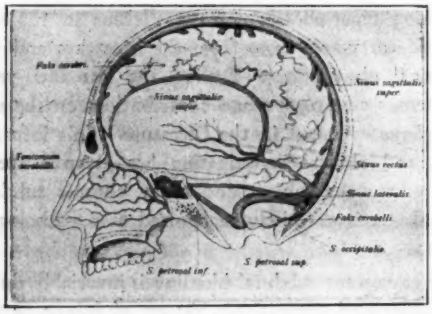


Fig. 1. Sup. long. sinus with short communicating cerebral from cortex. These veins frequently lacerated in chronic subdural hematoma. (Anatomy of the brain and spinal cord) Whitaker.

Chronic subdural bleeding is always venous in origin and may occur over one or more hemispheres. Following the laceration of one of the small vessels, there may be no immediate complaints. As the bleeding goes on and a clot slowly accumulates, symptoms appear. These may come and go, especially if the patient lies down. The bleeding is intermittent and considerable time may elapse between the time of injury and the frank onset of symptoms. In the average case, about two weeks elapse before sufficient pressure occurs to give symptoms.[6]

Headache is usually the first symptom. This is severe and persistent. It may continue a week or more at a time and then rapidly subside should the patient be put to bed or given drugs. However, in spite of rest and treatment, some dull headache usually persists. The tendency is for the headache gradually to increase in severity and assume all of the characteristics of headache in intracranial tumor. That is, it is more severe at night or in the early morning hours. It is generalized, persistent, dull, and boring and often accompanied by bouts of vomiting, the latter not infrequently precipitated by sudden changes in position. Vertigo may also accompany the headache and vomiting, likewise brought on by sudden postural changes. With these symptoms there are frequently mental changes. The patient becomes dull, his attention is blunted and memory defects are observed. The memory defect is usually for recent events. These patients are occasionally committed to a hospital caring for mental patients on the assumption that they are suffering from a psychosis. It is not unusual for these individuals to become indecent in speech and conduct. Insomnia, irritability, and neglect of the sphincters, often occurs. Many of these cases present symptoms of a frontal lobe disorder and this often accounts for the erroneous diagnosis of brain tumor or dementia. The entire symptomatology runs a peculiar course characterized by periods of remission and exacerbation. This may continue for weeks and months (possibly, as given by some authorities, for a year)[7]. During conscious moments the mind may appear quite normal and responses are usually accurate. Towards the end, a state of stupor develops, followed by deep coma. Even in this state the patient may pass alternately from a state of coma to consciousness. This peculiar alternating of coma with consciousness is almost characteristic of chronic subdural hematoma. It is probably due to varying degrees of cerebral arachnoidal edema and changes in the ventricular system capacity. As the clot increases in size, there is a gradual displacement of cerebrospinal fluid from the ventricles and arachnoidal spaces and the margin of safety becomes small in the terminal state.

Generalized convulsive seizures may occur, especially toward the latter part of the illness.[8] Focal convulsions rarely, if ever, occur, although slight fibrillary muscle twitchings are often observed. Occurring with this symptomatology is a neurological picture suggestive of a gross expanding cerebral lesion, at times strikingly similar to a deep-seated cerebral neoplasm involving the capsule or basal ganglia. The hematoma may lie over the cerebral cortex from the upper to the lower central convulutions, produc-

ing a progressive paresis of the face, arm, and lastly the leg. (Fig. No. 2.)

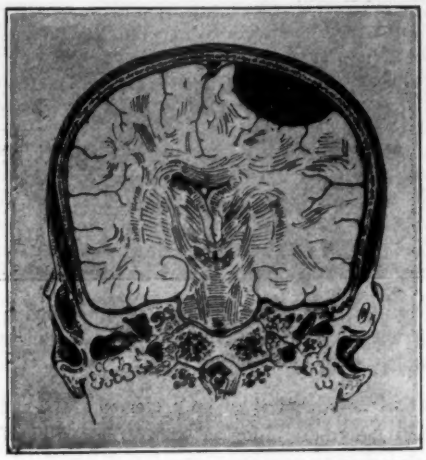


Fig. 2. Sketch of cross section of head showing hematoma on upper part of cerebral hemisphere along the side of the superior longitudinal sinus.

Rarely are the separate motor zones singled out, nor is there a true paralysis of the side involved. Usually an extensor toe sign, or some associated pathological pyramidal tract sign, will be discovered and occasionally a bilateral Babinski sign is found when contrecoup cortical pressure or stem dislocation (pyramids) has taken place. It has been observed that aphasia rarely occurs in chronic subdural hematoma. This is probably due to the extracortical location of the lesion. In two cases of left sided hematoma (right handed patients) where the cortex over the lower central convolutions had been extensively compressed, aphasia could not be detected. (See Cases No. 1 and 7.) The contralateral abdominal reflexes are frequently abolished. With these findings there is usually a slow pulse, an elevated blood pressure, and often increased cerebrospinal fluid pressure. The latter, however, is normal in many instances and alone should not offset the more positive neurological findings. The color of the cerebrospinal fluid is often altered to a faint xanthochromic tint. Again, a clear fluid is frequently found. Occasionally we see a case with signs of meningeal irritation (rigid neck and positive Kernig, leukocytosis and fever). (See case No. 8.) The presence of free blood in the subdural and subarachnoid spaces gives rise to these symptoms.

The condition of the eyegrounds, as a rule, does not give us important diagnostic information. In some well-advanced cases the eyegrounds may be entirely normal or present only a faint retinal edema. Later a mild venous congestion, decrease in the depth of the physiological cupping, and obscuration of the discs appear. One case is reported where the eyegrounds presented frank hemorrhages, exudate, and pronounced choking of the discs (See Case No. 1). Normal eyegrounds with an advanced state of increased intracranial pressure, have been observed in this condition and may confuse the diagnosis (Cases 2 and 3). A normal fundus is not incompatible with a diagnosis of chronic subdural hematoma. In several cases recently observed, with well-marked signs of increased intracranial pressure, the fundus has been normal. Occasionally, a field defect develops and this is of considerable importance in localization (See Case 5).

The presence of a hematoma is indicated by a telltale pigmentation or peculiar yellowish-brown mottling of the dura. In some cases the dura has a dark bluish tint due to the underlying clot. When the dura is reflected, the clot is usually seen to be well demarcated from the cortex. There is a bluish or greenish sheen to the hematoma. Its dural surface is tough, the mass fluctuates and the borders may be smooth and rounded. The hematoma lies entirely in the subdural space and has an organized, well-developed capsule. It has no direct connection with the dura or the arachnoid. Occasonailly the dura may be slightly adherent to the hematoma. Depending upon its age, the clot may be rather firm and of a currant-jelly color and consistency or else soft and fluctuating, due to liquefaction. When incised, if it is a long-standing hematoma, the capsule will show numerous well-developed capillaries. The fluid may be of different color, depending upon its age. Older clots are likely to be bile colored, brown, or yellowish. The more recent the hematoma, the greater the tendency to retain the color of coagulated blood. The capsule easily stripped from the underlying arachnoid and the cortex of the brain usually will be flattened and yellowish, due to the long-standing compression. The cortical vessels appear tortuous and compressed.

The capsule of the hematoma is composed of fibrous tissue intermingling with scattered mesothelial cells which have migrated in from the meninges. On the arachnoidal side of the membrane is a well-organized layer composed of mesothelial cells. These, in form and general appearance, are related to the reticulo-endothelial system and closely resemble, histologically, Kupffer's cells of the liver. The bile pigments are found in the contents of the hematoma and there is some speculation that the cells of the meninges are, under certain conditions (pathological) responsible for the formation of bile pigment.

The cortex around the hematoma frequently shows a considerable degree of arachnoidal edema and on pricking the arachnoid there may be a copious escape of cerebrospinal fluid. So-called pachymeningitis hemorrhagica interna is probably the same as subdural hematoma, the only difference being one of degree, in the organization of the clot. The peculiar thickened appearance of the dura occasionally seen in the spinal and cranial dura is not the same lesion, pathologically, as the encapsulated subdural hematoma.

The differential diagnosis must take into consideration an intracranial tumor, abscess, or possibly a state of uremia. The presence of a subdural hematoma is frequently overlooked and a diagnosis of the above-mentoined conditions will be given first consideration. One must consider, in the differential diagnosis, chronic subdural hematoma in an insane individual unless the psychosis follows the clear-cut clinical symptoms of a particular type of dementia, and even in these cases, where trauma has occurred, it is unsafe to ignore the possibility of hematoma.

Direct puncture of the ventricle may be necessary in order to clearly localize the lesion. This is especially ture where bilateral neurological signs are present. (See Case 3.)

The treatment is always surgical, although opinions differ as to the best method of exposure, some favoring the osteoplastic flap operation, while others prefer the simple subtemporal decompression operation. It has been the author's observation that the condition of the patient will largely govern the method for the exposure of the lesion. If the diagnosis can be made with a reasonable certainty and the general state of the patient is satisfactory, then the osteoplastic flap operation may be used with safety. Many of these cases are admitted in a state of deep coma and in poor general condition. The turning down of a large flap only adds to the delay and invites more risk, due to the time required to make and close the flap. Not infrequently, time is an important element in the management of such conditions and it is felt that for the average case the simple subtemporal muscle-splitting incision, with an adequate decompression, is sufficient. Some operators prefer the use of multiple trephine openings with irrigation for the removal of the hematoma. There are a few cases in which the hematoma forms on top of the hemisphere adjacent to the longitudinal sinus and involves only a limited area. This occurred in one case and the hematoma was almost overlooked. (See Case 4.) It is seldom, if ever, that the hematoma re-forms and one need have no fear in effecting a tight closure." (Fig. No. 3.)

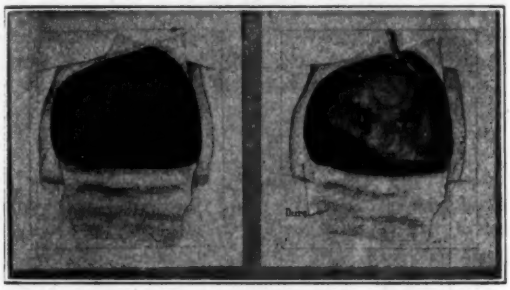


Fig. 3. Photograph of craniogram showing both ventricles dislocated to the left. Direct puncture of ventricle with insufflation of air. Case 3.

Local anesthesia is to be preferred. The use of a general anesthetic adds an unnecessary risk. Dehydration may be required following the removal of the hematoma. The release of the brain from long-standing pressure may result in an exaggeration of an already existing edema.

The following cases have been considered of sufficient interest to warrant their presentation in an abbreviated form. Each one is a separate clinical lesson:

CASE NO. 1. T. M. Seen in consultation with Dr. A. J. Ghiglione at Providence Hospital, Seattle, Washington, on January 8, 1930. Patient gives a history of vigorous health all his life until one month ago when he began to complain of headache, nocturnal in character, with dizziness, nausea, and occasional bouts of vomiting. There was no history of an injury although there was a history of a recently infected foot. He consulted a nose and throat specialist who advised removal of his tonsils as a possible cause of headache. No relief followed this procedure and, in view of the increasing severity of the headaches, he was admitted to the hospital.

Patient was in a drowsy condition although he could give a reliable history. He complained bitterly of his head, keeping his hands against his forehead most of the time. The eyegrounds showed an advanced degree of choking of the discs about 4 diopters. There was a slight weakness of the right hand and a lateral coarse nystagmus to the left. His speech mechanism was intact, although complete tests for aphasia could not be carried out, due to his mental condition.

A diagnosis of brain abscess was favored, although chronic subdural hematoma could not be eliminated. On these meager neurological findings, a localization was made upon the left side and a subtemporal decompression carried out.

The dura had the characteristic pigmented appearance. It was tense and bulging. On reflecting this, a greenish-blue mass was seen. Incision of the capsule of the hematoma permitted extrusion of a

large quantity of liquefied blood clot under pressure. This was removed by irrigation with normal saline and the wound was closed without drainage. Subsequently, he gave a history that about one month prior to the onset of headaches, he had received a glancing blow on the left side of the head during a boxing match. There was nothing unusual in his convalescence and he made a prompt recovery.

CASE NO. 2. P. R. This man was seen at the City Emergency Hospital on January 4, 1931, suffering from multiple contusions of the head and face, with discoloration about the eyes and a linear fracture in the right temporoparietal region. After a short period of shock, he improved and his condition was quite satisfactory. A lumbar puncture was performed the second day after his admission to the hospital and the fluid was blood stained. The pressure was 12 (mercurial). The eyegrounds remained clear.

He was transferred to the Swedish Hospital the second day following his injury, where observation was continued with Dr. Paal Torland. On the third day following the accident, it was noticed that there was a slight sagging of the left side of the face, of the central type. The eyegrounds remained normal and all of the deep reflexes were normal. No pathological reflexes were elicited. The strength of the extremities was normal and equal and patient's mental condition seemed a little brighter. His speech seemed free of defect.

A second lumbar puncture was performed and the pressure was 10 mm. (Hg.). The fluid was slightly amber colored.

On the fourth day there was a rapid decline in pulse rate to 40 to the minute. Prior to this it had ranged from 80 to 70. It remained slow and, in spite of the absence of definite neurological findings or any changes in the eyegrounds, a diagnosis of chronic subdural hematoma on the right side was made and operation advised.

Under novocaine block, a right-sided subtemporal decompression was accomplished. The dura was found to be bulging. A moderate accumulation of clotted blood was evacuated from beneath the dura. The brain pulsated but seemed to be tense and dry. His condition was not satisfactory and the operation was hastily terminated. He improved somewhat during the day but the next morning his condition was not considered satisfactory and the left side of the skull was opened through a subtemporal decompression. The dura was found to be bluish, tense and bulging. A large hematoma, partly coagulated, was evacuated under increased pressure. The brain pulsated normally but did not fill up the "dead space." The wound was closed without drainage. His condition improved and it was thought that he was in satisfactory condition until the following morning, when respirations ceased, and, although artificial respiration was instituted, he did not revive.

CASE NO. 3: F. M. Referred by Dr. P. G. Mikkelson, of Renton, Wash. Age 55 years. Occupation, laborer.

Admitted to Martha Washington Hospital August 4, 1931, from his home in Renton, Wash. His chief complaints were severe frontal headache and dizziness.

A story was obtained from the family that on May 15, 1931, he fell, striking the back of his neck on the hard earth. He was not unconscious and resumed his work. Some time later, a matter of several days, he began to complain of persistent headaches. There was some nausea and vomiting. It was noticed that the headache would come and go. On reclining he was free of symptoms but on resumption of his work, the headaches would return. The family also noticed during the last two or three months a distinct change in his mental state. He became forgetful, irritable and dull, and more or less childish. On several occasions he exposed himself and voided publicly. Further information was obtained that the man was formerly a bright, happy, well-mannered individual.

The neurological examination showed the following points of interest: A strong bilateral positive Babinski sign and decrease of patellar and abdominal reflexes. The fundal veins showed a slight engorgement.

A lumbar puncture was performed with patient lying down. The pressure was 22 mm. and the fluid clear.

In order to localize the lesion, a direct puncture of the ventricle was performed on August 6, 1931, 30 cc. of fluid being withdrawn from the ventricle through a trephine opening over the left occipital region, and 20 cc. of air insufflated into the ventricle. The accompanying reproduction of the craniogram shows the ventricles displaced to the left and somewhat compressed. (Fig. 4.)

Fig. 4. Sketch of chronic subdural clot exposed at operation.

A diagnosis of chronic subdural hematoma compressing the right frontal lobe was made.

On the same day a decompression was effected over the right side through a muscle-splitting inci-

sion and a liquefied hematoma containing at least a half pint of old blood was evacuated. Patient"s condition rapidly improved and he was discharged from the ho pital on the seventh postoperative day. (Fig. 5.)

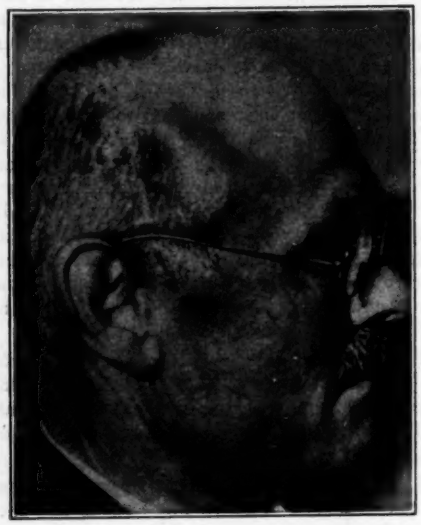


Fig. 5. Photograph of patient. Case 3. Simple decompression type of incision on 12th postoperative day.

CASE NO. 4: S. T. Seen in consultation with Dr. Carl Leede at Columbus Hospital, October 27, 1930.

The family gives a history that patient has suffered from continuous headaches for a number of months, as far back as a year. There was no history of an injury. Lately they have noticed mental retardation and during the last week he has been in a state of coma.

Examination: Patient in deep coma. Slight movements about the mouth and no response when painfully stimulated, strong left Babinski, Oppenheim, and Gordon. Deep reflexes practically abolished and the abdominals absent. Eyegrounds show moderately advanced choking of the discs, about 2½ diopters on the right 2 diopters on the left. Neck is slightly rigid. Pulse 45. Temperature, 100° F. Mild leukocytosis (13,000).

A diagnosis of chronic subdural hematoma involving the right celebral hemisphere was made and on the same evening, October 27, 1930, under novocaine block, a subtemporal exploratory decompression was performed with evacuation of a large, well-organized hematoma containing liquefied blood. The capsule about the hematoma was tough and was discovered only on exploration of the upper part of the hemisphere, lying along the superior longitudinal sinus. Following the operation the patient responded and was able to carry on a conversation with his family. Dehydration measures were instituted. In spite of energetic postoperative treatment, hyperthermia developed on the third postoperative day, and he expired.

CASE NO. 5: A. E. B. Age 62 years; occupation, stevedore. Seen in consultation with Dr. O. F. Lamson at Swedish Hospital, Sept. 4, 1931.

There is a history that about two months ago he began to suffer from severe headaches occurring chiefly during the night but more or less continuous. The headaches seemed to be localized more on the right side of the head. There was no history of an injury, although he admits straining himself on one occasion by lifting a large case of salmon and noticed that evening that he developed a severe headache, which has persisted up to the present time. About a month ago he awoke one morning and noticed that he could not see out of the right half of each eye.

Examination: A homonymous hemianopsia on the right side of the face. The eyegrounds were somewhat full but cupping was present and the margins clear. The veins were slightly tortuous and congested, the left grip weak and definite astereognosis present. Patellar reflexes practically abolished.

A lumbar puncture was performed. Pressure was 12 mm. in the reclining position. Fluid clear.

A direct puncture of the ventricle, with insufflation of air, was considered advisable to more accurately localize the lesion. In the presence of the hemianopsia and the astereognosis, it could not be determined whether the occipital or temporal lobe was involved.

A direct puncture was performed on September 4, over the left occipital region, and about 20 cc. of fluid removed and replaced by 20 cc. of air. Craniograms were then made which showed the right ventricle entirely obliterated and the left ventricle dilated and displaced to the left. (Fig. No. 5.)

A diagnosis of chronic subdural hematoma was favored, although, in view of the involvement of the optic pathways, a subcortical tumor involving the right occipital lobe could not be eliminated.

A right-sided osteoplastic flap operation was performed, with evacuation of a large subcortical and subdural hematoma with large quantities of fluid. The clot was organized over and in the right occipitoparietal lobe. Immediately following the operation, patient noticed a return of sensation in the hand and improvement in vision.

He was discharged from the hospital on the seventh postoperative day, considerably improved.

CASE NO. 6: F. W. A middle-aged white male seen at Ballard Eagles' Hospital, October 29, 1930.

Patient's wife gives a history that two weeks ago he was in a brawl and fell, striking his head. He bled from the left ear. He was in the hospital for 24 hours and then was discharged to his home. He continued to have severe headaches, chiefly during the night, with nausea and vomiting. The headaches became very severe and on October 28 he was re-admitted to Ballard Eagles' Hospital in a state of coma.

When examined he was in a deep stupor and could not be aroused. There was a strong right and left

Babinski, Chaddock, and Oppenheim. Deep reflexes on the left side were decreased. There was apparent weakness of the left side of the body. The right pupil was slightly larger than the left and unresponsive to light. The eyegrounds appeared normal in every respect. Respirations were slow and shallow.

A lumbar puncture was performed with patient lying quietly on the side. Pressure was 8 mm., with a very faint amber-tinted fluid.

A diagnosis of chronic subdural hematoma was made and on the evening of October 29, under novocaine block, the right side of the head was explored through a subtemporal decompression opening. Immediately beneath the dura, covering the entire side of the hemisphere as far as could be ascertained, was a well-encapsulated hematoma partly liquefied and partly clotted. This was about two inches in thickness and dislocated the hemisphere so that, on removal of the hematoma, there was a dead space between the dura and cortex of approximately 1½ inches.

Following the operation there was no improvement in his condition and the following morning the left side was explored. The cortex appeared compressed but there was no evidence of a hematoma. There was no improvement following the second operation and, in spite of active dehydration, hyperthermia developed, temperature rising to 106 degrees, and patient expired. Postmortem examination declined.

CASE NO. 7: V. M. Seen in consultation with Dr. W. C. Calvin at Seattle General Hospital, October 6, 1931.

There is a history that two weeks ago he was struck over the left side of the head by a bandit. He was treated at the City Emergency Hospital and then transferred to the Seattle General Hospital, where he remained for about three days, and then was released to his home. Ever since the injury he has suffered from severe headaches occurring principally during the night. These have been more or less continuous. There has been no nausea or vomiting. It was observed by the family physician that two or three days following the injury patient was unable to enunciate clearly. This lasted several days but gradually cleared up.

On examination, the following positive signs were found: The right pupil was slightly larger than the left. There was a healing lacerated wound over the left frontal region, about an inch long, with greenish-blue discoloration under the scalp extending over an area about the size of the palm of a hand. There was some tenderness around this area. The discs showed a mild congestion of the veins with obscuration of the margins of the discs and obliteration of the physiological cupping, more noticeable on the left side. His speech was slightly thick. The right grip was deficient as compared with the left and there was absence of the abdominal and tendon Achilles reflexes.

A lumbar puncture was performed with patient lying quietly on the side. The pressure was about 20 mm. and the fluid faintly xanthochromic.

A diagnosis of subdural hematoma was made and decompression advised.

In view of the history of transient aphasia and the pupillary inequality, it was decided to explore the left hemisphere. Under novocaine block, a subtemporal decompression incision was made and the dura exposed. This was tense, bluish and bulging. On incision, a large, partly liquefied hematoma was removed by irrigation and brain spoon and the wound was closed without drainage. Convalescence was uneventful.

CASE NO. 8: M. M. Age 53 years. Married. Occupation, housewife. Seen in consultation with Dr. J. J. Sims at Swedish Hospital, October 28, 1931.

A history was obtained that on October 23 she fell down a short flight of stairs in her basement, striking on the right side of her head. She was unconscious for a short period. After about three days she began to complain of violent headaches. She vomited several times and, about the fourth day after her accident, her husband found her in a stuporous condition and she was brought to Swedish Hospital in a stupor.

Examination showed a small laceration, healing, in the right frontal region, with a small amount of discoloration about the area. There was no local tenderness. The neck was very rigid, Kernig sign was positive, the fundus showed a beginning venous engorgement with tortuosity of the ophthalmic veins but preservation of the physiological cupping. Pupils were equal. The left side of the body showed a very definite hemiparesis, including the face, arm, and leg. Abdominal reflexes could not be elicited. There was a bilateral Babinski sign and absence of the patellar and tendon Achilles reflexes.

Lumbar puncture showed a pressure of 18 mm. with the mercury instrument. Fluid was xanthochromic, Wassermann 3 plus, and globulin positive (history of an old luetic infection many years ago with temperature ranged close to 102 degrees Fahrenheit and blood chemistry showed no abnormalities. Her temperature ranged close to 102 degrees Fahrenheit from date of admission to the hospital, pulse between 80 and 90, and respirations 20. X-ray was negative.

A diagnosis of chronic subdural hematoma was made, favoring the right side, although, with a bilateral Babinski sign, the possibility of a bilateral hematoma or contrecoup prsesure from a clot on the right side, could not be overlooked.

On October 28, 1931, under 1 per cent novocaine block, an incision was made on the right side and dura exposed. There was increased intracranial pressure and the dura was tense and bluish in appearance. On incision and reflection, there was a definitely organized hematoma with a thin capsule. On rupturing this, there was extrusion of a copious quantity of partly clotted, partly liquefied blood under pressure. Wound was closed without drainage.

There was some improvement in patient's condition during the latter part of the operation, and she was able to converse with the operators. The following day, her condition was not considered satis-

factory and it was decided to explore the left side.

Accordingly, on the afternoon of October 29, 1931 under 1 per cent novocaine block, the left side of the skull was opened and the dura exposed. It was tense and had a bluish appearance. On incision there was extrusion of a copious quantity of dark, liquefied blood clots under considerable pressure. The dura was left open and the wound closed without drainage.

Folllowing this latter procedure, patient's condition improved markedly and, with continuous dehydration of 50 per cent glucose, 50 cc. twice daily, together with rectal injections of magnesium sulphate, 50 per cent, her condition improved to such extent that she rapidly emerged from coma into complete consciousness.

The sutures were removed on the third postoperative day, and convalescence was uneventful.

SUMMARY

1. History of a mild head injury, with subsequent interval free from symptoms, followed in the course of time by insidious development of signs of increased intracranial pressure.

2. Motor and sensory involvement, slowly developing hemiparesis.

3. Eyeground changes usually observed late in the condition, but not invariably (some terminal cases with normal eyegrounds).

4. Cerebrospinal fluid may or may not be xanthochromic, and pressure may be normal or increased.

5. Pathological lesion is a simple cystic accumulation of blood in the subdural space, surrounded by a well-developed capsule, with numerous reticuloendothelial cells.

6. Bilateral subdural hematomata are occasionally found.

7. Treatment: either osteoplastic flap operation, subtemporal decompression, or multiple trephine openings, depending upon the whim of the operator and condition of the patient. Dehydration.

8. Eight cases reported.

REFERENCES

1. Virchow, R.: Hematoma dura Matris, Verhandl. d. phy. Med. Gesellsch 7:134, 1857, and Virchow's Pathology, A. Hirschwald, Berlin, 1858.

2. Trotter, W.: Briti h Journal Surgery, Vol. 11, 1914, p. 271.

3. Putnam, T. J.; and Cushing, H.: Chr. subdural hematoma, Arch. of Surg. 11, Sept., 1925.

4. Jelsma, F.: Chr. subdural hematoma, Arch. of Surg. 15:45-46, July, 1927.

5. McConnell, A. A.: Subdural hemorrhage following trivial accident, Irish Journ. of Med. S. C., pp. 160-161, April, 1930.

6. Biemond, A.: Traumatic subdural hematoma which existed five months before operation was performed, Case. Med. Tij. d' Shi. V. Geneesk, 1:664-667, Feb. 9, 1929.

7. Putnam, T. J.; and Cushing, Harvey: Chr. subdural hematoma, its pathology, its relation to pachymeningitis hemorrhagica and its surgical treatment. Arch. of Surg. 11, Sept., 1925.

8. Stewart, Sir Purvis: The diagnosis of nervous diseases, Arnold, 6th Edition.

9. Griswold, R. A.; and Jelsma, F.: Relationship of chr. subdural hematoma and pachymeningitis hemorrhagica interna; report of 8 cases, Archives of Surgery, 15:45-46, July, 1927.

10. Fleming, H.; and Jonse, O. W.: Chr. subdural hematoma, Surg. Gyn. & Obst. Jan., 1932, 54, 1, p. 81.

11. Craig, W. M.: Chr. subdural hematoma, Surg. Clinic No. America, 7:1523-1529, Dec., 1927.

SPINAL ANESTHESIA

By E. W. ADAMSON, M. D.
Douglas, Ariz.

(Read before the Forty-first Annual Meeting of the Arizona State Medical Association, held at Globe, April 21-23, 1932.)

From the start of civilization, man has endeavored to discover means whereby the senses could be dulled to pain and grief. Innumerable attempts were made to accomplish this during the early ages by mechanical means and through the use of drugs for internal and external application and various concoctions for inhalation. Many references of this nature are to be found in existing chronicles, and the mythological and religious literature of the ancient world.

In the classic age of Grecian literature, Homer writes in his Odyssey that Helen of Troy put a drug into wine to "lull all pain and anger, and bring forgetfulness of every sorrow." Herodotus, the Greek historian, later records the inhalation of fumes from a variety of hemp by the Scythians which caused an exalted mental state and sleep.

At an early date, hashish and other drugs were employed in Egypt. Narcotics were used by the Jews and Chinese on criminals to produce a weakened mentality for confession of crimes and to alleviate the agonies of their death struggles. The Chinese and Assyrians used drugs to relieve the anguish resulting from the rough surgery of those times.

Pliny and Dioscorides, at the beginning of the Christian era, describe several methods then in vogue for benumbing areas preceding incision and cauterization, but up to and during the Middle Ages little real progress was made. The methods generally employed to prepare patients for surgery at the beginning of the nineteenth century were: Either the extensive use of opiates; intoxication with alcoholic beverages; the application of ice or freezing salts to

cause local insensibility; or a combination of these applications. The patient generally had to be held on the table and suffered intensive shock and agony during the operation.

Although ancient, medieval, and modern history furnish numerous examples of the use of drugs and other media to bring about partial or complete insensibility, it was not until well into the nineteenth century that the beginning of surgical anesthesia can be said to have actually appeared. The struggle to find the ideal method is still raging, and one by one the various new drugs are placed in the discard. The probabilities are that there never will be the ideal, universal anesthetic, but pioneering has gone on and on and just now we are re-opening a field once or twice deserted, and, with refinements, it promises to be one of greatest benefit.

The profession is still widely divided upon the merits and demerits of spinal anesthesia and one finds equally distinguished authorities standing at both ends of the controversy. There are those who never use it, and never would, and, at the other extreme, those who would use it and do use it for every operative procedure, without regard to its location—even for head operations.

I well recall sitting in a certain distinguished surgeon's clinic in an eastern teaching center and hearing him rather bitterly denounce a fellow-worker in the same city, who was then pioneering in spinal anesthesia, for using such a dangerous method; then, three years later, sitting in the same clinic and seeing the same surgeon do almost his entire morning list of cases under spinal anesthesia. This only shows that wise men change their minds, and that good pioneering had accomplished its purpose and made what, to this surgeon's mind, had been a dangerous method, a safe one. So controversies are good things, because they bring out all the obtainable facts and stimulate the protagonists into intensive search for better and safer methods and improvements. There is, no duobt, a certain definite set of indications and contraindications to almost every surgical procedure.

Spinal anesthesia is known also as: (1) intra-dural anesthesia; (2) lumbar anesthesia; (3) sub-arachnoid anesthesia or block. The last is probably the most correct term as it describes the method on an anatomical basis.

Although really originating in this country, subarachnoid block has been a rather recent comer as a practical method in our American clinics, but has known extensive use in certain European and Latin-American countries.

Corning, in 1885, first attempted to influence the spinal cord by injecting a solution of cocaine between the spinous processes of the vertebrae. He did not expect to penetrate the dura, but this probably did happen, since loss of sensation and motion in the lower extremities was produced, a condition which does not result unless the puncture and injection is intradural. Although Corning suggested the feasibility of the method for the production of anesthesia in surgical operation, its significance was evidently not understood and no practical method resulted.

The lumbar puncture of Quincke was of great importance for further progress and when this procedure became established as a diagnostic and therapeutic method, a further step towards spinal anesthesia was easier.

To Bier belongs the credit of having purposely produced surgical anesthesia by injection of anesthetic drugs *into* the spinal canal. In 1899 he published the results of eight anesthesias, which he had practised upon himself, his assistant, and six patients. The wide-spread use of the method, despite Bier's warnings, was followed by a rapid abandonment owing to the dangerous symptoms produced by cocaine.

In 1891 Biessel isolated tropococaine from the leaves of the Java cacao plant. The toxicity of this drug is about half that of cocaine, and it has ever since enjoyed great favor in Germany. It was not, however, until 1904, when Fourneau discovered stovaine, that spinal anesthesia was again brought before the profession. The same year Einhorn introduced novocaine, which was found much less toxic than any of the anesthetic agents known. Its combination with adrenalin gave it a high practical value in the method of local anesthesia, and for this it is still considered the ideal drug; but injected intradurally it was disappointing and the pioneers of spinal anesthesia went back to the stronger drugs. The ill-effects of these drugs and occasional fatalities form the basis of many adverse reports relative to spinal anesthesia. In the meantime, long, careful experiments were conducted with novocaine and it is now the drug of choice and has placed spinal anesthesia upon a firm footing as a logical procedure.

METHOD

Naturally, when dealing with a procedure which, for many years, has met with considerable opposition, especially on the part of those who had little or no experience of its principles, one should be cautious about trying too many procedures and experimenting with several different technics. There are various methods, differing now mostly in the solvent

for the anesthetic drug. Some workers use a solvent heavier than the cerebrospinal fluid; others, a lighter one; still others use no foreign fluid as the diluent, but use the cerebrospinal fluid itself.

Dr. George P. Pitkin, of Teaneck, N. J., has succeeded in producing a solution and method which, he claims, allow complete and easy control of the extent of the anesthesia. The claims for his method are very alluring and it is receiving quite extensive application in many clinics. His anesthetic solution is marketed in ampules of 25 cc. size, and 3 cc., containing 200 mgs. and 300 mgs. respectively of novocaine, strychnine sulphate 2.2 mgs., in a special solvent consisting of alcohol, sterile water, with the addition of any amylo-prolamin combination (a type of starch). It is claimed that the viscous character of this solution prevents diffusion in the spinal fluid, and that it floats like the air-bubble of a spirit level on the spinal fluid, and thus the height of the anesthesia is controlled by regulation of the angle of the table.

The other generally used method uses the cerebrospinal fluid as a solvent and, as the anesthesia is quite satisfactory, its simplicity makes a strong appeal to many operators. This is the method with which your essayist is most familiar and the one which will be detailed here. It is not offered as the best or safest, but as one which has given a large percentage of ideal anesthesia without untoward effects of any sort.

ANATOMIC CONSIDERATIONS

The spinal cord in the adult extends to a level of the upper border of the second lumbar vertebra where it becomes continuous with the filum terminale, which extends as a bundle of connective tissue to the termination of the dural sac at the second or third sacral vertebra. The spinal cord and cauda equina are surrounded by the same membranes as the brain—dura, arachnoid, and pia. The dura is a loose sheath not attached to the bony framework of the spinal canal, but separated from it by loose areolar tissue containing a plexus of veins, which are most numerous in the front and on the sides.

The space between the spinous processes of the 3rd and 4th lumbar vertebrae is larger than either the 1st, 2nd, or 5th. Here also the nerves making up the cauda equina are arranged in two more or less distinct lateral bundles; hence, these interspaces are considered the ideal ones for entrance of the needle, as the interspace is more easliy entered and there is less danger of injuring any nerve trunk with the point of the needle.

INSTRUMENTATION

The instruments consist of those for skin preparation and a couple of sterile dishes; sterile distilled water; and proper syringes and needles. While a special syringe is not absolutely necessary, it should not leak and the plunger should run easily. Formerly puncture was made without anesthetization of the skin, but broader experience has proved that it is not only more comfortable to the patient to anesthetize the skin first with ½ per cent of novocaine, but that such anesthetization also facilitates the puncture of the dural. Two spinal puncture needles are always used, to provide against some accident happening to one. The spinal needle should be of medium gauge so as to avoid too rapid flow of spinal fluid, and leave a very small puncture wound of the dura—one capable of immediate closure on withdrawal of the needle. Its length should be such as to allow the hand to be supported against the patient while the hub of the needle is held between the thumb and forefinger. The bevel should be short so that, when it has entirely perforated the dura, the point does not prick the cord or cauda equina. It must be unbreakable but should not bend too easily. Steel needles are damaged by rust and are apt to break. Platinum needles are too soft and become crooked after a few punctures. Nickeloid needles are best. The stylet should fit exactly and run smoothly.

The anesthetic drug is put up in ampules with rather large, long necks. It is in an anhydrous state and of the greatest purity, and comes in various dosages, as 10 mg., 12 mg., 15 mg., 20 mg., and 30 mg.

PREPARATION OF THE PATIENT

The patient should be brought into as helpful a frame of mind as possible through suggestion, and the operation should be undertaken with all the preliminary care as to psychical influences which is observed with general anesthesia. The role of the nurse is most important here, and that nurse who has had the experience of many cases done under spinal anesthesia is of inestimable value with such preparation. A hypodermic of morphine, gr. ¼, with scopolamine, gr. 1/200, or atropine, gr. 1/150, is given one hour before anesthesia is induced, except in very weak patients whose vital organs are seriously affected.

TECHNIC OF INJECTION

The syringe and needles should be thoroughly washed out with sterile, distilled water to make sure they are clear and working properly, and to remove

any alkali adhering from sterilizer water, as novocaine action is inhibited by alkali.

The patient is now caused to assume the sitting position, with the legs hanging down and with the feet resting on a stool; the body is bent well forward, with the arms folded across the abdomen. A nurse should stand in front of the patient and place her hands upon the patient's shoulders to steady the patient and prevent bending laterally. If the patient's condition is such that he cannot take the sitting position, puncture can be made by turning on the side, with the knees and chin approaching as closely as possible.

Formerly it was our custom not to give ephedrine until puncture and injection of the anesthetic was complete, but latterly we have noted that the intramuscular injection of ephedrine about ten minutes before anesthesia is completed, using one or two grains of ephedrine, has resulted, in almost every instance, in avoiding the sudden drop of blood pressure which tends to occur after spinal injection of novocaine. Since adopting this time for the injection of the vasomotor stimulant, we seldom have a patient exhibiting pallor, sweating, or nausea.

The whole back is now painted with a solution of mercurochrome, from the point of contact with the table upward to the lower angles of the scapulae and laterally to the midaxillary line. Sterile towels are placed across the table immediately back of the patient and here, ready to hand, are placed the syringe with one needle attached, the needle to be used for the puncture, a few small gauze sponges, and the ampule containing the novocaine, the top of which has been previously filed and broken off. The interspace to be used is now located by finding the crest of the ilium, as a horizontal line connecting the crests runs either through the spinous process of the 4th lumbar vertebra, or just below it. The spot to be punctured is now definitely indicated by rubbing away some of the mercurochrome stain, and with a fine needle an intradermal wheal is raised, using ½ per cent novocaine and about 1½ cc. of the same solution is injected into the interspinous ligament. In about one minute the spinal needle may be painlessly entered through the wheal.

With the greatest care to remain exactly in the midline, the needle is advanced, as a rule easily, through the interspinous ligament, and, if the direction is correct, no distinct resistance will be met until the dura is reached. Advance now continues with a distinct jump of the needle and a "snap" is communicated to the fingers of the operator as it penetrates the dura. Withdrawal of the stylet is at once followed by a flow of the cerebrospinal fluid. When absence of blood or cloudiness shows no damage has been done to veins and that there is no intraspinal pathology, the opened ampule is held under end of needle until almost filled. The stylet is carefully replaced to stop flow of fluid while novocaine is being put into solution in the ampule. This solution is accomplished by repeatedly aspirating into the syringe and expelling again into the bulb of the ampule, and, when finally complete, the solution is aspirated into the syringe and all air is expelled. The stylet is now carefully removed from the spinal needle and the syringe is tightly attached thereto. The syringe is slowly filled with cerebrospinal fluid. Half of this is slowly injected, more new spinal fluid is aspirated and a greater amount injected, until, at the end of four or five such maneuvers, the syringe is emptied. The needle is then quickly withdrawn.

An intelligent attendant sitting at the patient's head is a wonderful asset. It adds much to his mental ease during the operation if his attention is engaged by conversation, not merely for the sake of diverting his attention to some other topic, as in the case of local anesthesia, but to put his brain to active work. Questions requiring long answers are best. Every now and then the patient is asked to take a few deep breaths. Breathing through the mouth is of especial advantage in abdominal and pelvic operations, as it relaxes the pressure on the diaphragm. The application of cold, wet sponges, often renewed, on the lips, forehead, and neck, is highly appreciated by the patient, and minimizes the tendency toward nausea and vomiting. If nausea sets in despite the cold sponges, the nostrils of the patient should be closed by pressing between the index finger and thumb, so as to compel him to breathe through the mouth.

It should be explained to him that when anesthesia is established he will be unable to move his legs and that the lower half of his body will "go to sleep." He should be assured that there will be no pain, although he may feel the surgeon working.

Except in gastric surgery he may be allowed sips of water, or allowed to eat small pieces of ice.

FAILURES

Failures occur in about 5 per cent of patients, even with skilled administration. This includes cases of complete failure, partial, incomplete, or unilateral anesthesia, and short or delayed anesthesias. It is no crime to have to resort to general anesthesia, and as one's skill increases, the failures become fewer. If

the operative procedure requires more than an hour, it will probably be found necessary to complete with inhalation narcosis, but usually the amount required is very small.

AFTER-EFFECTS AND THEIR TREATMENT

The after-effects incidental to intraspinal block are apt to occur at periods more or less close to the time of injection. The immediate symptoms are the outward expression of a series of phenomena which are chiefly dependent on the sudden lowering of the blood pressure: Pallor of the face, sweating, complaint of feeling sick, then nausea and vomiting. The respiration becomes shallow and infrequent. All these symptoms are now entirely absent or very slight, since using the routine injection of ephedrine before anesthesia is induced.

Nausea and vomiting will occur occasionally in the Trendelenburg position and in the course of operations on the organs of the upper abdominal cavity, especially the stomach. If the psychoanesthetist is alert, such occurrence can almost always be avoided by requiring the patient to take a few deep breaths.

Real respiratory failure, when it occurs, is a serious matter, and the surgeon or the person responsible for the anesthesia must attend closely and be given every assistance by the remainder of the operating staff.

If it is necessary to complete the operation with the aid of general narcosis, care must be exercised to give it gently and gradually, watching the respiration, especially when inhalation begins, as some patients hold their breath at that moment, and faint.

If operative conditions permit, it is customary to give the patient a cup of hot, black coffee, soon after he has been returned to bed. It should be taken slowly, in small sips. There is no established rule for the position of the patient in the bed; any comfortable position may be permitted after two hours have elapsed from time of introduction of the anesthetic.

Inasmuch as the sphincters are relaxed, due to the anesthetic effect on the sympathetic nervous system, it happens, once in a while, that a patient evacuates the rectum or bladder during the operation. This is not only somewhat annoying, but fraught with some danger in gynecological operations in the Trendelenburg position, unless prepared for in advance, as the feces are liable to soil the operative field, and. is especially dangerous in complete hysterectomy. It is; therefore, advisable not to give a cathartic the day preceding operation; to attempt through cleansing of the colon by at least two soda enemas the day before; and I make it a practice to prepare the vagina surgically and pack it. fairly tightly in all cases in which the surgical attack is likely to involve the uterus. This incontinence wears off with the rest of the anesthesia and is never persistent. Retention of urine occurs, but not more frequently than with general anesthesia, and yields just as easily. Ocular palsies, especially of the abducens, is mentioned by some writers, but I have never encountered a case. Likewise, headaches seem to give some oprators a great deal of trouble, but I have never had a case which did not yield quickly and easily to aspirin.

INDICATIONS

There are certain conditions which emphatically indicate the employment of spinal block: (1) The "acute abdomen." Here the perfect anesthesia is realized, with complete muscular relaxation of the abdominal muscles, and, because of the effect on the sympathetic nervous system, the bowels have become flat and lose their tendency to crowd the operative field. This is what the French call the "silent abdomen," a most precious condition for easy and efficient exploration of the entire abdominal cavity and manipulation of the diseased viscus. The anemia resulting from the fall of blood pressure adds another valuable element to this abdomen, and it is quite universally conceded by those familiar with this form of anesthesia that the mortality of the "acute abdomen" is greatly reduced, and that gas distention and spastic ileus are rarely encountered. The advantages of spinal anesthesia are particularly evident where operative intervention is required in tuberculosis, bronchitis, emphysema, asthma, cardiac diseases, pyelitis, diabetes, acidosis, hypertension, alcoholism, and drug addiction. Acute conditions of the abdominal cavity are greatly benefited by its use in very fat patients. It is an almost ideal anesthetic for any type of operation below the level of the umbilicus, especially those of the pelvis and lower extremity.

CONTRAINDICATIONS

The chief contraindication to spinal block is a very low blood pressure, that is, below 100. Even here it may be used by using a sufficient amount of cardiac and blood vascular stimulants. Patients in a state of shock or toxemia need only local infiltration, with or without the addition of a light inhalation narcosis. It is obvious that pathological conditions of the spine, tumors of the brain, contraindicate its use. Lesions of the skin in the lumbar region may make lumbar puncture dangerous! When the cerebrospinal fluid is cloudy, the injection had

best not be made. Children under sixteen are not good subjects. As in local anesthesia, highly nervous and excitable persons are poor subjects for spinal anesthesia, and, when it is tried in such, recourse to general narcosis is frequently demanded.

ADVANTAGES

The advantages are many and have been mostly indicated in the preceding discussion, and they increase with increasing use, experience and added skill of the administrator. Also, if the surgeon is not the anesthetist, and will revamp his operative technic slightly to fit the anesthesia a little better, the results and advantages are increased.

There is only one real disadvantage connected with intraspinal block; the anesthetic agent cannot be administered gradually until the stage of surgical anesthesia is reached, but the full dose must be injected at once; and the fact that, when it has worn off, a second injection cannot well be made. Failure to obtain full anesthesia happens occasionally; it is sometimes delayed in onset, or does not reach to the desired level. Most of these incidents, which are reckoned against spinal anesthesia, occur less and less frequently as the skill of the operator increases.

I believe it may quite confidently be predicted that, with the introduction of new hypnotic anesthetics such as amytal and invertin, the next step toward ideal anesthesia will be a basic anesthesia first induced by the use of one of these drugs, and then the use of either spinal or regional methods for the essential anesthesia. Here lie alluring fields, but that is another story.

BIBLIOGRAPHY

1. Genesis 2:28.
2. Odyssey IV.
3. Talumd.
4. Matthew 27:34.
5. Mark 15:36.
6. John 19:29.
7. Proverbs 31:6.
8. Pitkin, Geo. P., Journal of Med. Doc., N. J., 1927.
9. Labat Gaston, Regional Anesthesia.
10. Ferguson and North, Surg. Gynec. & Obst., 54, No. 4, 1932.

DISCUSSION

DR. R. D. KENNEDY (Globe): I have found spinocaine, which is put out by the Merck Company, very satisfactory. It is injected with the patient on his side. The height of the anesthetic is determined by the amount injected and the elevation of the upper part of the body. The patient is turned on his back immediately and put in the Trendelenberg position as soon as desired height is obtained. This anesthetic lasts about forty-five minutes; in one case I had it lasted an hour and a half.

DR. G. R. STEVENSON (San Diego, Calif.): I notice that there has been much favorable comment without the report of an unfavorable result. It is true, however, that a number of fatalities have occurred in the most experienced hands. A very competent urologist I know has been using it successfully for six or seven years without a single fatal result until the case I shall mention. In this case the anesthetic had just been completed, the patient had been draped and no operative procedure had taken place, when the patient stopped breathing, due to respiratory failure which we could not explain. Spinal anesthesia is not as free from danger as we are led to believe by some of the over-enthusiastic. Especially is this true if universally chosen as an anesthetic by the inexperienced and infrequent operator.

We have felt justified in administering ephedrine at any time during the operation if the fall in blood pressure warrants it.

DR. C. E. YOUNT (Prescott): I, too, had noticed the absence of unfavorable comment on the use of spinal anesthesia.

Back in 1900 we used fourth-grain tablets of cocaine, resulting in terrific headaches. By 1904 we had learned to use tropococaine with the spinal fluid as a solvent. Our technic had improved and the patient was relieved of much discomfort.

I agree that it is most useful in operations on the lower abdomen and the lower extremities, also in eclampsia cases, which, in this entlightened day, are not supposed to occur, but somehow do, anyway. Spinal anesthesia does not overload the already overburdened eliminative organs. But the fact remains that when the plunger has gone home for the last time, and the anesthetic has been allowed to flow into the spinal column, it can never be recalled, and cannot be influenced by the position of the patient, regardless of what others may state to the contrary.

DR. HARLAN SHOEMAKER (Los Angeles, Calif.): We have a few minor differences in the administration of spinal anesthesia. Ephedrine given prior to the spinal puncture invariably controls the loss of blood and attending nausea. We have been able to cut out one of Dr. Adamson's steps by having our needles, syringes, and other equipment autoclaved. Even a slight amount of salt in the sterilizing water upsets the activity of the drug introduced into the spinal fluid. In one case, after I was sure that my needle was in contact with the spinal fluid, it refused to flow. A few drops of oil were found on the stylet, probably left by an instrument nurse cleansing the needle. All of our injections are made with the patient lying on his side and shoulders parallel.

The x-ray pictures of patients for whom a spinal anesthetic is contemplated frequently show arthritic exudate on the vertebrae. If we had not had this picture, we might have been held responsible for a certain amount of low back pain.

We determine the level of anesthesia by the amount of fluid withdrawn, and the duration of an-

esthesia by the size of the dose. It is a wise precaution to test the level of anesthesia prior to an incision. We use only one withdrawal of fluid and one injection, and waste not a single drop of spinal fluid.

Particularly in fractures of the lower extremities is spinal anesthesia valuable. No amount of etherization can produce the complete relaxation secured with spinal anesthetic. One of its characteristics is the suddenness with which its effects wear off. On an average, 150 mg. dose of anesthetic persists in its effect for forty-five minutes.

In giving a spinal anesthetic wtih the patient on his side, it is of utmost importance that he be kept absolutely quiet, with his shoulders in a vertical position.

DR. J. E. BACON (Miami): This matter of establishing alibis before juries is very important. Spinal anesthesia is new and therefore not understood by the patient, although he can understand it when a cone is placed over his face. Years ago we regarded spinal anesthesia as a last resort to be used in extreme cases only, and this attitude persists to some extent.

We boil our anesthesia implements in distilled water. Another precaution I think worthy of attention is to make a very slight cut with a sharp blade in which to insert the needle, thereby obviating the possibility of carrying infection from the skin into the spinal canal on the needle.

DR. ADAMSON (closing): I am greatly pleased and flattered by the discussion provoked by my paper. I have gained a great deal from it. The possibility of using the autoclave for sterilization of implements had not occurred to me.

Taking an x-ray of a patient's back before administering a spinal anesthetic is a very wise precaution. We had a case of a man who fell from only an eighteen-inch scaffold and claimed a back injury. An x-ray of his back revealed arthritis of the whole vertebral column. We learned then that he had been treated extensively for it. Had he been given a spinal, he might have claimed it to be the cause of the alleged back pain. It is undoubtedly a good plan always to have an x-ray of the back before attempting spinal anesthetic.

The height of the anesthesia I can control only by the size of the dose of novacaine; 100 mg. is usually a sufficient dose for most procedures below the pelvis. We used 150 mg. during a Whitman operation of the hip. A soldered-in gallbladder cannot be cut out without some inhalation anesthesia. When the effects of the anesthetic begin to wear off, we can see the contracted gut ballooning and, a minute or so later, the patient complains of pain.

I prefer to make the administration of spinal anesthesia with the patient in the sitting position. It is necessary to use a much larger dose for an appendectomy than for a hysterectomy, because, although the organs are situated at about the same anatomical level, their enervation is from much different levels.

As for the needle best suited to this use, I like a 22-gauge, nickeloid needle, with the point beveled at 45 degrees.

Drs. Shoemaker and Kennery have mentioned the value of the use of spinal anesthesia in surgery of the lower extremities. This is especially true when the patient is suffering from shock. Do not be afraid to give the patient big doses, because it will give great relaxation and reduce shock. To the ordinary patient of 130 pounds, I give two grains.

I began using spinal anesthesia in 1924 and have never had a death or any untoward or alarming results.

It was through an accident that we learned the value of giving ephedrine before the completion of the anesthetic. The nurse gave it before we were through with the spinal, and the patient was found to get along better than when it was given afterward. We now give one to two grains of ephedrine ten minutes before spinal puncture and seldom see any of the disagreeable signs of blood pressure drop, such as pallor, nausea, vomiting, or sweating. Nausea and vomiting do occur in operations of the upper abdomen, but they do not in those of the lower extremities.

Another point worthy of mention is that spinal anesthesia will differentiate between a dynamic and an adynamic ileus. If one is confronted with this question, give 0.150 mgs. of novocaine by spinal puncture and, if the obstruction is of the adynamic type, the bowels will promptly evacuate.

TRAUMATIC RUPTURE OF NORMAL SPLEEN; DELAYED SPLENECTOMY. RECOVERY.

By W. L. REID, M. D.
Phoenix, Arizona

The normal spleen in its well-guarded position receives relatively few injuries. However, the organ is so vascular that these injuries result in a high mortality rate, particularly when there is prolonged delay of surgery. The following case is especially interesting in that operation was delayed nine hours and yet the patient recovered.

History: Eight months ago a young man of twenty, in splendid health, was cranking a high-powered car. As he succeeded and stepped aside, the racing motor caused the fan literally to "explode." One blade was driven through the hood of the machine with terrific force and struck the young man in the lower left thorax, knocking him down and stunning him momentarily. He was taken immediately to the nearest physician's office. After a short rest, the patient felt much better. The physician's examination revealed a small perforation, one-half inch long, in the ninth interspace at the anterior axillary line. It was bleeding steadily, but not profusely. A large contusion, four inches in diameter, surrounded the wound. There was a moderate amount of pain and tenderness in the left upper abdominal quadrant,

especially under the costal margin. Beyond this, the physical examination was said to be negative. The wound was not probed but was cleansed with alcohol and painted with mercurochrome. One suture was taken in its edges "to stop the bleeding," and a sterile dressing was applied. The patient was then told that his injury was not serious and was advised to "go home to bed and forget it." This was at 9 p. m. He reached home at ten o'clock and promptly went to bed. Five hours later he awoke suddenly with marked air hunger and with considerably more pain in the left abdomen. On attempting to sit up, he fainted. Regaining consciousness, he shortly managed to wake members of the family, who summoned a second physician. The wound was still bleeding. His night shirt and parts of the bed linen were saturated with blood. After examining the patient. the doctor diagnosed "internal hemorrhage," suspecting an intercostal vessel as the source. He administered one-fourth grain of morphia hypodermically and advised immediate hospitalization. The family demurred. A third physician thought the hemorrhage was coming from the chest and suggested immediate exploratory thoracotomy.

The patient was hospitalized at 5 a. m., eight hours after the time of injury. On the way to the surgical floor, he fainted again. The radial pulse was not perceptible. The resident physician, sensing the patient's desperate condition, promptly started a venoclysis of normal saline (1000 cc.) and glucose (200 gms.). External heat was applied and one-sixth grain of morphia (hypodermically) was given to prevent further shock. The patient rallied steadily and after thirty minutes felt much better. A careful examination was then made.

Physical Examination: The characteristic picture of profound hemorrhage and shock was quite obvious, and the pallor was extremely marked. The temperature was 97 degrees; the pulse, 147; blood pressure 80/62. The lungs were clear and breath sounds were normal throughout. A roentgenogram of the chest was negative. The abdomen was slightly rigid on the left side and particularly tender to moderate pressure along the left costal margin. Percussion revealed shifting dullness along the entire left side, especially noticeable in the flank. During the examination the wound began to bleed more freely.

Diagnosis and Operative Procedure: A diagnosis of ruptured spleen was made and the patient was operated at 6 a. m. (nine hours after time of injury). The abdomen was opened under local anesthesia and the diagnosis verified. The spleen had received a perforating wound near the hilum and also a rupture almost its entire length on the external surface. Under ether inhalations, splenectomy was performed. During the operation, 500 cc. of normal saline and glucose were given intravenously. The abdomen was drained through the original perforation and the incision was closed in the usual manner. Before the patient left the operating room, a direct transfusion (600 cc. of whole blood) was given.

Convalescence: The immediate postoperative condition was fairly good. A second transfusion was given the following day. Recovery was uneventful. The abdominal incision healed promptly. The drain was removed on the tenth postoperative day, after which the perforation healed rapidly. The patient was dismissed from the hospital on the seventeenth postoperative day, in excellent condition.

DISCUSSION

This case illustrates how easily an extensive rupture of a normal spleen may be entirely overlooked, particularly when the patient is seen immediately after an injury of this type. Early symptoms and findings are vague, and, at best, are only suggestive even when the examiner is keenly alert to the possibilities. The small perforation and the patient's tendency to minimize his injuries served to veil the true picture. The severe contusion, the location of the injury, and the history that the victim was "knocked down and stunned momentarily," were valuable "leads." The symptoms of massive hemorrhage and shock, which followed later, left little doubt as to the diagnosis.

When I first saw this patient, he was in a state of collapse. Immediate surgery would doubtless have been fatal; such a patient must always be rescued from systemic shock before additional—operative—trauma is imposed. Delay beyond a certain point would have been equally disastrous. Fortunately, this was avoided by the patient's prompt response to external heat and the venoclysis. The transfusion replenished a badly depleted vascular system and prevented recurrence of shock. Morphia given at frequent intervals during the first twenty-four hours provided the much needed rest and freedom from pain.

The mortality which follows operations of this type depends largely upon the extent and severity of associated trauma and the amount of hemorrhage and shock. In Dretzka's[1] series, the total mortality was 37 per cent. However, in his uncomplicated cases, the death rate after splenectomy was only 12 per cent.

Eight months have elapsed since the operation. The patient is in splendid health; the blood picture within normal limits.

The spleen is only one of a large group of tissues of similar function, and this explains why its removal causes little or no change in the functions of the body.[2] Leo[3] recently reported a case with a practically normal blood picture twenty-one years after splenectomy for wound of the spleen. As W. J. Mayo[3] so aptly said, "the spleen is much more important pathologically than physiologically."

REFERENCES

1. Dretzka, Leo. Rupture of the spleen. Jour. S. G. and O. 258-261. August, 1930.

2. Leo, G. Bull. et mem. Soc. de chirugiens de Paris. 23: 274-277. May 1, 1931.

3. Mayo, Wm. J. Surgical aspects of diseases of the lymphoid organs, with especial reference to the spleen. Collected Papers of the Mayo Clinic and Mayo Foundation. Vol. 21, 1929.

TWO CASES OF TULAREMIA TREATED WITH INTRAVENOUS MERCUROCHROME.

JIM CAMP, M. D.
and
J. HILLIARD CAMP, M. D.
Pecos, Texas.

The two cases herein referred to were in the same family, presented rather typical text-book pictures of the glandular type of tularemia; gave history of having skinned wild rabbits; and the blood of the patients gave a positive reaction for tularemia.

B. W. M., a young adult male, previously in good health, skinned two wild rabbits March 19, 1932, and had onset of tularemia March 24, 1932. On the 14th day after onset of illness, at which time he was running an afternoon fever to 102.5° F. he was given 10 cc. of a one per cent solution of mercurochrome intravenously. There was a moderately severe mercurochrome reaction, consisting of abdominal cramps, mild vomiting, and diarrhea lasting for about twenty-four hours. Forty-eight hours after the administration of mercurochrome, the patient's temperature was normal and has remained normal since. He has felt well, returning to work on the fourth day after mercurochrome. The ulcer at site of inoculation, on the finger, began an immediate improvement, but required about ten days for complete healing. This patient had one very large lymph-node at the elbow and a smaller one in the axilla; the axillary gland very slowly reduced in size and finally disappeared. The epitrochlear gland failed to resolve, remaining very hard, though painless, until about three weeks after mercurochrome, when it broke down and had to be evacuated.

Mrs. N. E. W., aged 62, mother-in-law of the first patient, was exposed to the same rabbits and had onset two days earlier. Because of her very bad general condition, a severe mercurochrome reaction was feared and she was given her medication in divided doses. Treatment was started on the twentieth day, at which time she was running an afternoon fever of 103° F. She was given 3 cc. of a one per cent solution, intravenously, with a mild reaction lasting about an hour. On the 22nd day of her illness, she was given 4 cc. of a one per cent solution, intravenously, with no reaction. On the 24th and 25th days, her afternoon peak of fever was 99.6° F., and on the 25th day she was given another dose of 3 cc., intravenously. On the 27th day, her temperature returned to normal and has been normal since. As in the first case, the site of inoculation made a steady but gradual improvement. There were five enlarged nodes from two ulcers, one on each hand, that reacted as in the first patient. The proximal node in each arm broke down about three weeks after cessation of fever and required incision; the others very gradually receded. The broken down nodes in both patients were painless and gave the impression of cold abscesses.

COMMENT

Two cases are, of course, insufficient to warrant the evaluation of a method of treatment, but treatment of these two cases of tularemia with intravenous mercurochrome was markedly and immediately beneficial and, in view of the facts, first, that other treatment has been unsatisfactory, and second, that treatment with mercurochrome is not suggested in the literature, these cases are reported.

CORTICAL ABSCESS OF KIDNEY
Case Report.

KEVIN D. LYNCH, A. M., M. D.
and
ROBERT F. THOMPSON, B. A., M. D.
El Paso, Texas.

(Presented before El Paso County Medical Society, April 11, 1932.)

K. G. M., age 23, entered April 3, 1932. This young man was complaining of pain and tenderness in the right loin upon admission to the hospital. Five weeks previously he had sustained a severe fall while playing tennis and had received a terrific blow in this side when he struck the corner of the concrete court. For a few moments he was stunned, but he was soon all right. A few days later he noticed a "catch" in the side but gave it little attention. Then gradually slight pain and tenderness manifested themselves and these symptoms progressively grew worse until the time of admission.

During this five-week interval he lost considerable weight (25 pounds), and began to run a little afternoon temperature.

Upon examination he was seen to be acutely ill, with an anxious expression, and with definite tenderness in the right kidney area. There was no rigidity of abdominal muscles, either anteriorly or posteriorly. Examination of urine from bladder and each kidney was essentially negative. It is particularly noteworthy that the urine from the right kidney contained no pus cells. This remained true in subsequent urinalyses.

Bilateral pyelograms revealed an elongated right pelvis with deepened blunted calices. These x-ray

findings were suggestive of renal tumor or polycystic kidney. Pyelography in erect position, in contrast with those made in supine position, showed that the right kidney had lost its normal mobility and was firmly fixed, presumably by an inflammatory process. The psoas shadow was obliterated on the right side but perinephritic abscess was ruled out by the above essential points of the physical examination.

Renal function tests showed that the right kidney excreted only 10 per cent of the dye in the first hour in comparison with the 40 per cent ability of the left. Another estimate two days later duplicated these findings approximately, revealing a marked diminution in the excretory power of the right kidney.

Blood study gave the following findings: Blood urea, 43 gm. per 100 cc. of blood; hemoglobin, 75 per cent; R. B. C., 3,600,000; W. B. C., 18,000. Differential showed polys 80 per cent.

During the week that this case was being observed and studied the temperature ranged around 101 to 103° F. each afternoon and the blood pressure remained at 100/50. The pulse was noticed to be full and regular at all times and stayed between 80 and 90.

From the temperature, leukocytosis with predominence of polymorphoneutrophiles, pain and tenderness in the right loin, and with the symptoms becoming aggravated all the while, it was realized that an infectious process was being dealt with, despite the fact that the urine from the right kidney was free from pus cells.

With the pre-operative diagnosis of cortical abscess, operation was decided upon, and on April 9, 1932, under spinal anesthesia, this was done. The kidney was exposed by a loin incision and a large abscess was seen in its mid portion. From this about a pint of thick, yellow pus was evacuated. Drains were inserted into abscess cavity and the wound was closed. The convalescence thus far has been very satisfactory.

This case is presented to show that an extensive suppurative process may be present in the substance of the kidney without pus in the urine and that such a process may result from trauma.

ESOPHAGEAL OBSTRUCTION

CASE REPORT

R. B. HOMAN, Jr., M. D.
El Paso, Texas.

(Presented before El Paso County Medical Society, April 11, 1932.)

Patient: Mr. S. R. C., 37 years old.

First Examination: January 9, 1932.

Chief Complaint: Bronchial asthma.

Present Illness: Patient developed chronic bronchitis and a severe cuogh following measles at the age of 4. This did not clear up and did not get worse until he had pneumonia while in the army in 1918. He was admitted to the army after an examination, at which time his bronchitis was somewhat better. Following this attack of pneumonia, his bronchitis became asthmatic in type. He had numerous skin tests for allergy but these were all negative. He has a fairly constant difficulty on inspiration and is subject to more severe attacks during which inspiratory and expiratory phases are involved. There is also a severe productive cough at these times. He has taken adrenalin, ephedrine, and codeine at various times with indifferent success. His asthmatic condition has continuously grown worse, and is especially severe in a damp climate. He has always been somewhat dyspeptic, as he states it, and frequently, as a child, he remembers regurgitating his food, especially when he would stoop over. However, he had no idea that there might be anything wrong with his stomach or esophagus until his convalescence from the pneumonia in 1918, when he had a weighty feeling in his lower chest. The doctors who examined him at that time made no mention of pathology in the esophagus. Following his discharge from the army in 1918, he was sent to Fort Bayard as a tuberculous suspect. Had frequent x-rays at Fort Bayard and other army hospitals, but no mention was made of a mass or esophageal condition until 1924. He was sent to Reed Hospital and a diagnosis of thoracic neoplasm, diaphragmatic hernia, and dilatation of the esophagus, was made. The pressure pain in the lower chest continued.

At the present time his esophageal condition does not seem any more severe than it was 12 years ago. He cannot eat solid foods at times, while at others he seems to have no difficulty eating them. He is forced to sit up for a while after eating to prevent regurgitation. Frequently at night he has to arise and spit up food which he regurgitates, and he says at times there seems to be some pus mixed with this regurgitated food. Only once, at the age of 15, did he notice any blood in the vomitus. He depends on semi-solid and liquid foods for his diet. He frequently strangles on the food and throws himself into paroxysms of coughing.

Past History: Measles at the age of 4. Pneumonia at the ages of 8, 15 and 24. Denies venereal disease. Family history and marital history are irrelative.

Physical Examination: Best weight, 130; present weight, 104. Temperature at time of examination, 98.6°. General appearance: Patient is somewhat emaciated and there is moderate dyspnea at rest. Has frequent hacking cough. Asthmatic wheeze is plainly heard. Pupils are regular and react to light and accommodation. Nasal septum deviates to the left. Pharynx slightly granular. Chest is emphysematous in type. There is apparent difficulty on both inspiration and expiration. Tactile fremitus is increased at both bases, posteriorly. There is diminished resonance in the bases, posteriorly, and in the interscapular region. Breath sounds are harsh and bronchial in type. Many inspiratory and expiratory wheezes. These are heard over the entire chest. Nu-

merous coarse and medium moist rales in the bases are not affected by cough. Heart is in normal position but the right cardiac dulness is about 1.5 centimeters outside of the right sternum border. Heart sounds are clear and there are no murmurs. Blood pressure is 130/96. Pulse rate 76 per minute. Abdomen is ptotic in type. There are no palpable masses. No hernia. There is moderate clubbing of the fingers with slight cynosis of the nails. No other deformities.

Pathology: Urine normal. Sputum examination negative for tubercle bacilli; mixed infection moderate. Hemoglobin, 90. Red blood cells, 4,736,000; white blood cells, 10,000; polys., 73 per cent; lymphocytes, 18 per cent; basophiles, 1 per cent; eosinophiles, 2 per cent; transitionals, 3 per cent; large mononuclear lymphocytes, 3 per cent.

X-ray Readings: Heart is normal in size and position. The lung fields are fairly clear. There are a few calcified glands at the hiluses, and a moderate amount of peribronchial thickening throughout. Posterior to the heart and extending about 1½ inches to the right, there is a large mass, smooth in contour, extending upward and inward and across the right border of the heart just about mid-way to the right auricle. This is dense and at first was mistaken for the right border of the heart. When barium was given, the esophagus showed definite ballooning above and even with this mass, extending down almost to the mid part of it. Then there is a definite constriction with the esophagus turning to the right and then sharply to the left, and continuing constricted to the cardiac end of the stomach. A barium meal emptied from this rather rapidly at first, and then slowly until at the end of 30 minutes a considerable amount of barium was still present in the esophagus. Stomach picture shows the position to be very low, set well down below the upper border of the pelvis.

COMMENT

This case is presented as a curiosity. I should like to know the opinions of the members of the society as to the probable etiology of this mass. The patient does not complain of it, but rather of asthma, which possibly could be somewhat relieved by an autogenous vaccine.

We know that esophageal obstruction is usually due either to cancer or to stricture resulting from the action of a corrosive substance. While this tumor is in the usual location of cancer, such tumor is usually fatal within a year after symptoms are noticed. There are no metastases evident. There is no history of corrosive poisoning. Other extrinsic tumors such as lipoma, fibroma, myoma, and so forth, have been reported as rarely seen. In this case, however, we have an esophagus which apparently courses through the tumor mass. This would rule out an extrinsic tumor, in my opinion. Tuberculosis of the esophagus is rare and usually takes the form of ulceration. Syphilis is also rare and this man has no history of infection and numerous negative Wassermann reports. Congenital stenosis is occasionally reported, but the child usually is afflicted with some other deformity and rarely reaches adult life. Chronic mediastinitis is a possibility.

We have then a case of partial esophageal obstruction with moderate dilatation of that portion of the esophagus above a mass of unknown origin.

TREATMENT OF ACUTE SPONTANEOUS PNEUMOTHORAX

HOWELL RANDOLPH, M. D.
Phoenix, Arizona

(Read before the Forty-First Annual Meeting of the Arizona State Medical Association, held at Globe, Ariz., April 21-23, 1932.)

The etiology of spontaneous pneumothorax is inseparably bound up with its therapy. Lord, of Boston, found that only four per cent of over a hundred cases gave a history of severe cough as a possible etiological factor. However, the consensus of opinion of a number of different authorities places trauma high in the scale of mechanical factors. From the standpoint of pleural changes predisposing to spontaneous pneumothorax, undoubtedly emphysema ranks high, with the formation of small subpleural blebs. Of relatively less frequent importance is tubercle formation on inflammatory subpleural changes. Spontaneous pneumothorax is not generally recognized until either severe pain is present or marked dyspnea develops. It starts usually with severe pleuritic pain and dyspnea out of proportion to the extent of the collapse. This is because of the pleural shock reaction to sudden separation of the two layers of the pleura. The pain becomes less severe in a few moments unless adhesions are present to cause pain by stretching of the pleural bands, but dyspnea increases over a period of a few moments to several days, depending on the size of the opening and its nature. Most cases pass through the stages of initial rupture, followed by valve action with air passing into the pneumothorax pocket with each inspiration, the hole closing during expiration. As the intrapleural pressure increases and the surface area of the visceral pleura diminishes, the hole retracts and becomes smaller until it finally closes. In case valve action does not continue but a sufficiently large opening is produced, the pressure with each inspiration and expiration averages the same as atmospheric pressure. In this type of case, bronchial fistula is most apt to

persist, with the attending complications. With this explanation of the production of pneumothorax in mind, it can be seen that the most critical time in the treatment of the whole course of this condition is at the onset.

That spontaneous pneumothorax represents a very important emergency in tuberculosis is shown by the fact that about ten per cent of the cases of fatal tuberculosis show evidence of either recent or old spontaneous pneumothorax of greater or less extent[1]. Many of these cases recover from the immediate effects of the spontaneous but die either from complications such as empyema, or from the indirect effect of reduction in lung volume, and extension of active disease. Others form small localized pneumothorax pockets which tend to obliterate themselves, while others actually derive considerable benefit from the collapse. This paper deals chiefly with the treatment of the initial stages of spontaneous pneumothorax. This is the time that the whole train of events which follows can be most influenced by proper handling of the case, and serious complications can best be prevented. Neglect at this period is apt to mean pyothorax, bronchial fistula, complications which may require major surgery.

As soon as the formation of pneumothorax is recognized, the treatment indicated by the urgency of the case should be instituted. Sedatives and stimulants, as required, should be given in large amounts at rather frequent intervals, provided that the amount of expectoration is not too great, in which case bronchial obstruction may occur from too active depression of the cough reflex, and pneumonia or atelectasis of the opposite lung supervene. In the presence of large amounts of sputum, use small doses of morphine with chloral, bromides, or sodium amytal. Cardiac stimulants are of doubtful value.

Use of oxygen for the relief of dyspnea and cyanosis is of immense importance and is often neglected. The new type of chamber, in which the temperature and humidity can be regulated as well as the oxygen content, should be used if possible. The intranasal catheter method will be found effective in reducing the respiratory rate ten to twenty per cent. In no type of illness will oxygen be found more useful than in these cases. The depth of respiration is very materially influenced by oxygen administration and is the chief consideration in that stage of a spontaneous collapse when valve action of the opening in the lung is increasing the intrapleural pressure beyond tolerance. The sudden deep gasp of an exceedingly dyspneic patient accentuates this valve action and much is to be gained by producing more shallow inspiration. Continuous administration of oxygen for several days, if need be, may be effective in carrying a patient through the acute stages and may be the deciding factor between recovery and a fatal termination.

Intrapleural pressure should be determined by the manometer. Decision as to whether air should be withdrawn, the pressure left the same, or air injected, depends on several factors. If the patient is near asphyxiation, air must be withdrawn, regardless of the pressure. If there is a negative pressure and the patient is not especially dyspneic, air should be injected either to the point of inducing beginning dyspnea, or neutral, or slightly positive pressure. If valve action in the pleural opening is still in operation, removal of air will hardly benefit and will probably be harmful by causing infected material to be drawn from the lung into the pneumothorax. If valve action is suspected in the presence of a negative pressure, the earlier air is injected to the point of tolerance or a positive pressure, the better.

Morelli[2] was the first to point out the mechanical advantages of positive pressure in spontaneous following chest injuries, his opinion being based on a large series of cases. As long ago as 1911 he recommended maintaining a plus 6 to 12 or even 20 centimeters of water pressure. This is hardly feasible in the average case of tuberculosis, but the object, namely, the prevention of pyothorax with a bronchial fistula, can frequently be accomplished if the mechanics of the lung are kept in mind and daily use of the needle practised. Air is rapidly absorbed by fresh pleura and a positive pressure one day is almost certain to become a negative pressure the next day. Frequent readings and appropriate injections of small amounts of air are to be resorted to.

To illustrate two types of acute spontaneous which present different problems of management, let me cite specific cases. The first patient was a man of twenty-five years, suffering from incipient tuberculosis with a minimal parenchymal involvement. He had never taken a bed-rest cure and, at the time of the occurrence of his spontaneous, was doing light work—interior decorating. Immediately following a slight fall from a low scaffolding, he had a sharp pain in the left chest associated with only a little dyspnea. He went about his work almost as usual but the pain was persistent and he complained of a sensation of fullness in the upper abdomen, as of pressure from below upon the left chest. It was found that the left lung was entirely free from the chest wall, showing about one-third collapse. In this patient the lung pathology was not such as to warrant

continuing pneumothorax for the treatment of the lung. Many times, re-expansion in this type of case will take place without mishap. In view of the fact, however, that recurrence of the spontaneous during re-expansion of the lung is rather a frequent occurrence, it is wisdom to carry pneumothorax for a few weeks, using small amounts of air frequently and keeping the pressure at an even level in order to allow time for a firm healing of the pleural opening. Thickening of the pleura will take place in a relatively short time.

A second case may serve to emphasize this point; a man of forty-four, with a moderate degree of old fibroid infiltration into both upper lobes, developed an acute attack of pain in the right chest, with extremely rapid pulse, marked dyspnea and cyanosis. Immediate thoracentesis of air was necessary to prevent asphyxia. After thirty-six hours under heavy doses of sedatives and several aspirations of air which was under high positive pressure, valve action through the pleural opening ceased. The patient continued to improve for a week. He then had a sudden recurrence of great severity, and, in spite of almost continuous removal of air, again registering high positive pressure, his dyspnea could not be relieved, and he died in seven hours. If this patient had been kept under pneumothorax for several weeks, there is every reason to believe that his lung would have been re-expanded without mishap.

Of prime importance is the underlying lung pathology. If a patient might benefit by artificial pneumothorax and he suffers a spontaneous collapse, he can often be continued as a therapeutic pneumothorax with good results. A case of this type is that of a man thirty-eight years of age, who had extensive tuberculosis of the fibro-caseous type, involving both upper lungs. A chronic case of nine years duration, he was in a practically stationary condition with one ounce of sputum daily, very little fever, fair weight and moderate dyspnea on slight exertion. He developed a pain in the right shoulder without much shortness of breath and it was found on fluoroscopic examination that he had a spontaneous covering only the upper part of the lung, the base being firmly adherent. The manometer showed the pressure to be negative. In spite of considerable trouble in the contralateral lung, continuation of this ideal selective collapse gave splendid results, with improvment of the patient's condition during the next ten months. At this time a spontaneous occurred on the opposite side, this time with fatal outcome.

Phrenectomy is a procedure which I venture to predict will be found to diminish the ill effects of spontaneous in selected cases. The dramatic results of phrenectomy, observed in cases with old bronchial fistula, prompts this suggestion. . In two patients the history showed bronchial fistula to have been present for more than six months, yet phrenectomy immediately stopped the expectoration of intrapleural pus and subsequent treatment showed these fistulae to have remained closed. If a case has been under observation and a thorough study has been made before the collapse occurs, it may be relatively easy to decide that phrenectomy is indicated and possible. Equalization of intrapleural pressure follows paralysis of the diaphragm. The changes in pressure with respiratory movements are much diminished. Elevation of the diaphragm relaxes the tension upon the visceral pleura. Valve action may be checked and the pleural opening allowed to retract. The crucial consideration is whether respiratory function can be borne without that diaphragm. The indications limit the procedure to a very small group of cases.

Theoretically, the use of the thoracoscope and direct application of Bethune clips appeals, but the technical difficulties of locating the pleural opening and placing the clips, with the patient in desperate condition, preclude the use of this method.

In conclusion, I wish to emphasize the following points in the treatment of acute spontaneous pneumothorax: In addition to the effective use of sedatives, in no illness is the continuous administration of oxygen more valuable; instead of removing air, instillation should be performed early in the course of treatment, if possible, and, in the event aspiration must be performed, it should be the aim not to remove more than necessary to relieve acute dyspnea. Intrapleural pressure should be tested at frequent intervals and kept at as near positive as feasible for several days after the acute condition is under control. A lung which has undergone acute spontaneous collapse should not be allowed to re-expand too rapidly under high negative pressure. With the underlying lung pathology in mind, phrenic exeresis or some other operative procedure should be considered.

REFERENCES

Wilson J. A.: Am. Rev. of Tub. 14, 51, pp. 577, 1926.

Morelli, E.: Gazetta Medica Italinia. 1911, Vol. 29. Treatment of Spontaneous Pneumothorax.

Medical Clinic of the University of Venice, 1920, Translated by Lincoln B. Davis. W. M. Leonard, Publisher, Goston. The Treatment of Wounds of the Lung and Pleura.

Bloch, Paul: Proc. sit.

DISCUSSION

DR. VICTOR RANDOLPH (Phoenix): I am especially interested in the point brought up by the

second case cited. I do believe that the removal of too much air is a very dangerous thing. In one patient in whom a spontaneous pneumothorax occurred in the course of bilateral artificial pneumothorax, the pneumothorax needle was kept in place and small amounts of air, sufficient only to relieve dyspnea, were removed at intervals over a period of 48 hours, at which time the lung perforation evidently closed.

I think this paper has brought out some very excellent points and I have enjoyed it.

DR. W. P. HOLBROOK (Tucson): Is spontaneous pneumothorax presumptive evidence of tuberculous etiology, or can one dismiss the patient and let him go back to work?

DR. HOWELL RANDOLPH (closing): The first case cited in my paper is possibly an example of "idiopathic" spontaneous pneumothorax. Undoubtedly, cases of spontaneous pneumothorax occur and are never recognized. The majority of them are caused by subpleural emphysema with rupture of a pleural bleb. The fact that they occur more frequently in tuberculous patients simply means that tuberculosis predisposes to emphysema.

Decision as to whether pneumothorax should be continued in any given case depends upon the underlying lung pathology which must be determined. The safest criterion is to allow the lung to re-expand gradually, and, before complete re-expansion has taken place, to take an x-ray picture. Every case of spontaneous pneumothorax should be given a few refills to allow the pleura a chance to thicken.

INTRAVENOUS UROGRAPHY

By CHAS. N. PLOUSSARD, B.S., M.D., F.A.C.S.
Phoenix, Arizona

Because of the difficulties sometimes encountered in cystoscopic and retrograde pyelography, search for a method suitable for rendering the urinary tract opaque by the intravenous route has been going on since 1918, when Cameron discovered that the iodine molecule was opaque to the x-ray. In 1923, Rountree, Osbrone, Sutherland, and Schol used sodium iodide for the purpose of outlining the urinary tract. No satisfactory pyelograms were obtained, so the attempts were abandoned for a time. When Cole and Graham developed the work of cholecystography, intravenous urography seemed more probable than ever before. Progress was slow, and no satisfactory procedure was developed until 1929, when Swick of New York, working with Lickwitz at the Altnover Hospital and Von Lichtenberg at St. Hedwig Hospital in Berlin, developed a solution which could be injected intravenously.

The first substance that outlined the urinary tract was called uroselectan. This contains 42 per cent iodine, which had a very low toxicity. This substance was relatively unstable, and had to be prepared shortly before use by dissolving forty grams in 100 cc. of distilled water. This had to be injected very slowly—at the rate of ten to fifteen cc. per minute. If injected too rapidly, the patient will complain of pain in the arm along the course of the vein used for injection, some headache, feeling of warmth in the body, and occasionally some nausea. This substance was excreted by the kidneys at such a rate that at thirty to forty-five minutes after injection the concentration was greatest in the urinary tract, and the best outline of the tract was obtained. At the present date we have a solution called skiodan, which is put up in 50 cc. stable solution. This solution contanis 52 per cent iodine. Fifty cubic centimeters is the adult dose. It is even less toxic than the original uroselectan, since it is possible to inject a smaller amount at a more rapid rate, therefore requiring less than five minutes for the entire injection. There is no pain, very slight feeling of warmth, and no untoward symptoms. It is eliminated by the urinary tract sooner, in greater concentration, so that the best outline of the urinary tract is obtained ten to fifteen minutes after injection. Another substance in use now is iopax and neo-iopax. This is an improved uroselectan substance.

There are a few things to be mentioned in preparing for intravenous urography that will probably aid in obtaining a clear film, and afford more protection to the patient. The patient should have a cathartic twenty-four hours before injection. Soft diet should be taken the evening before, and fluids limited during the night. Patient should go to x-ray in the morning without breakfast, and plain film should be taken. Two glasses of water should be given just before injection is begun. In cases where severe renal disfunction is suspected, a blood urea nitrogen estimate and phenolsulphonephthalein kidney function test should be obtained.

Skiodan is the preparation with which I am most familiar. Our technic is simple, a 50 cc. syringe and 22-gauge needle being used. I use a smaller needle, as I believe it is a factor of safety in preventing "speed shock." The patient urinates before the injection. He is placed in the Bucky table and a flat plate made in the recumbent position. The injection is then begun, excretion of the iodine watched under the fluroscope, and film is taken five minutes after injection is finished. Another film is taken fifteen minutes after injection, another at thirty minutes, and a later film is necessary to determine stasis or reten-

tion in the urinary treat. Some authorities state that it is necessary for the patient to empty his bladder before each film, because the solution in the bladder which gives an excellent cystogram may overlap the vesical portion of the ureter and thus hide possible pathology in this area. Others say that, when the bladder is allowed to fill, better ureterogram and pyelogram are obtained, because of more or less back pressure being present. I find the latter to be true; a moderate Trendelenburg position also favors obtaining more detailed films. We take the films in different positions to determine mobility of kidneys, kinks, and so forth, in the ureter, and, unless the ureter is quite dilated to its vesical portion, we do not allow the patient to empty his bladder. One hour after injection approximately 50 per cent of the injection solution can be recovered in the urine; three hours after, 75 to 80 per cent; nine hours after, 90 per cent; and in twenty-four hours, 95 per cent. This shows how little of the solution leaves the body through channels other than the urinary tract.

Intravenous urography is indispensable, for we can thus often arrive at a diagnosis in the urinary tract when it is impossible to investigate the tract any other way. We may be disappointed with the unsatisfactory results of the intravenous method, but such was the case while Graham and Cole were experimenting with the dye for cholecystography. I feel that many of these difficulties and disappointments will be overcome as our solutions and technic are further perfected. With our present knowledge we can not consider an excretion plelogram as equal to a picture made by the catheter method.

The majority of urological diseases are caused by infection, obstruction, or both. Skiodan will be of great value to us in many cases of obstructive uropathy, but will not help us much as far as the infections of the urinary tract are concerned, unless there should be an associated dilatation with stasis. This shows how necessary it is at times, in cases of both obstruction and infection that both intravenous pyelography and cystoscopy be employed. Intravenous urography will always have limited use because the cystoscope will so often be necessary before an exact diagnosis can be made. Probably the greatest weakness of the present method is its failure to outline minor deformities, as in early tuberculosis of the urinary tract, early malignancies, and early hydronephrosis, with slight blunting of the calices. Neither will excretory urography show us a "dead" kidney.

It has been shown that any of the solutions injected intravenously for pyelography have antiseptic properties. Bacteria will not grow, and urine will not decompose for days when it contains the solution injection.

It will be necessary to separate the indications, contraindications, advantages, and disadvantages of intravenous urography in order to complete the treatise. A few of the disadvantages have already been mentioned. A few indications will be enumerated and discussed.

(a) In cases of small contracted bladders, these bladders will not tolerate a cystoscope and will not tolerate distending fluid necessary for cystoscopic examination.

(b) In children, when referring physician does not approve of cystoscopy, and parents will not consent to it, or when it is impossible to do so.

(c) In the nervous patient who will not consent to be cystoscoped. Often the diagnosis can be made and treatment instituted on findings secured entirely by the intravenous method.

(d) In most cases of tuberculosis, when patient can not stand the ordeal of cystoscopic examination, and in some of these cases cystoscopy can undoubtedly be termed an ordeal. The lesions can usually be located in the upper urinary tract.

(e) In severe cystitis, with edema and swelling present, making identification of the uretel orifices impossible.

(f) In some cases of massive bladder tumors and bladder hemorrhage where cystoscopy merely increases hemorrhage.

(g) In ureteral stricture where catheter can not be passed to kidney.

(h) Where cystoscopy is impossible, due to ureteral stricture or prostatic hypertrophy or malignancy.

(i) In cases of active infection in the urinary tract, with fear of spreading infection.

(j) In very senile patients who can not stand cystoscopy.

(k) In cases of rectal implantations of ureters.

(l) In cases of malformation of ureters.

(m) In cases of rupture of the bladder or rupture of the kidney in which pyelograms are desired.

There are very few contra-indications to the intravenous method. Age is not a contra-indication. It should not be attempted in cases of anuria, uremia, severe damage to renal cortex, thryotoxicosis, or pregnancy with any evidence of renal failure.

Probably its greatest value comes in cases of obstruction with stasis; for example, hydronephrosis

with retention. Usually very clear films are obtained in these cases.

In prostatic hypertrophy, skiodan usually shows a definite bilateral ureterectasis and pyelectasis. This condition is present in a greater number of cases of prostatic hypertrophy than was formerly thought.

Ureteral obstructions are more easily located by the intravenous method. In cases of ureteral calculus we not only get good films with skiodan, but it informs the surgeon of those cases which are in need of immediate surgical attention because of complete blockage of the ureter; and it will distinguish these from the cases where only partial obstruction exists, and time might be well spent in cystoscopic endeavors to help descent of stone. Attempt to locate stone in cases of severe infection complicating the obstruction, by the retrograde method, often leads to febrile reaction which may be quite severe.

The excretion method is of incomparable value in diagnosis of renal tuberculosis. In cystoscopic maneuvers there is always danger of carrying the tubercle bacilli into tissue depths not already infected, but it is necessary to cystoscope a large majority of these patients in order to determine whether the disease is unilateral or bilateral. Cystoscopy in these patients is often very difficult. Most of them have intolerable bladders, and very often the ureteral orifices can not be identified. Very often these patients are too sick to stand cystoscopy.

Renal anomalies will be found more often in cases in which intravenous urography is employed. Unless bilateral pyelograms are taken, fused or ectopic kidneys, duplication of kidney pelvis, and so forth, are frequently overlooked.

It is an accepted fact at present that it is necessary to secure bilateral pyelograms in all cases where renal conditions are suspected. In these cases intravenous urography comes forward. It is far from the ideal procedure to do a bilateral pyelogram by the retrograde method at one examination. It is dangerous, in that complete anuria has been reported following bilateral retrograde pyelography.

If one kidney gives a good pyelogram and the other gives no shadow at all, it is either completely obstructed, dead, or absent. In this case cystoscopic examination and retrograde films will clear up the diagnosis.

The physiology of the kidney pelvis and ureter with relation to "systole," and "diastole" and peristalsis has been observed and studied by the intravenous method. Excessive peristalsis may simulate kink or stricture in the ureter. In other words, by excretion urography we are able to obtain a physiological pyelogram.

A retrograde pyelogram is often far from a physiological picture. The catheter in the ureter and the injection of a hypertonic irritating solution into the upper urinary tract, causing pain and spasm and forcing solution into the kidney pelvis to a point of forceful dilatation, play a part in causing the picture to be far from a physiological urogram.

We are attempting to approach this as nearly as possible in our retrograde pyelograms. We do not wait until the patient says he feels pain in his back to tell us the kidney pelvis is filled, but watch the pelvis fill with sodium iodide under the fluoroscope, and when it is completely outlined we stop the injection. We have never yet had a patient complain of a pain in the back at the time of injection with this method.

The urinary tract is all too frequently forgotten in both the acute and ordinary abdominal cases. Bilateral pyelography is valuable in obscure abdominal and pelvic conditions. A pyelogram with very little discomfort to patient and without any instrumentation may clear up a difficult problem in diagnosis.

The question repeatedly comes up as to the value of excretion urography in determination of kidney function. I believe it has a place in this respect, but our present observations and experiments are insufficient to enable us to arrive at a definite conclusion.

Intravenous pyelography will bring the urologist and roentgenologist into closer contact in spirit of cooperation, and not a spirit of competition.

Intravenous urography is considered safe. Here I will quote a case report given by J. A. Riebel and F. A. Riebel and published in Radiology, March, 1931.

Inasmuch as the literature to date indicates that intravenous pyelography is a harmless procedure, we feel it timely to present a case in which we feel that its use contributed to the death of a patient.

A. C., a white male, aged 53, was first seen by us on November 15, 1930. He gave a history of diabetes, and for two months had had a series of furuncles. Apparently both the diabetes and the furuncles had received indifferent treatment. For the past two weeks he had been running a fever and had lost twenty pounds in weight.

Examination on the following day disclosed an obese white male, apparently quite ill. Temperature, 104°; pulse 130; respiration 28. There was a large furuncle over the seventh left rib, and another over the right kidney. Palpation gave a sense of

(Continued on page 303)

Southwestern Medicine

Printed by THE A. C. TAYLOR PRINTING CO., Phoenix, Arizona
Published monthly for the Board of Managers of the four constituent societies.

VOL. XVI. JULY, 1932 No. 7

EDITORIAL STAF

DR. W. WARNER WATKINS, Box 1587, Phoenix, Arizona ..... Editor in Chief
DR. JAMES J. GORMAN, El Paso, Texas ..... Associate Editor
DR. ORVILLE H. BROWN, Phoenix, Arizona ..... Associate Editor
DR. L. B. COHENOUR, Albuquerque, N. M. ..... Associate Editor

BOARD OF MANAGERS
ARIZONA STATE MEDICAL ASSOCIATION

DR. D. F. HARBRIDGE ..... Phoenix
DR. CLARENCE GUNTER ..... Globe

EL PASO COUNTY MEDICAL SOCIETY

DR. PAUL GALLAGHER ..... El Paso
DR. W. L. BROWN ..... El Paso

NEW MEXICO STATE MEDICAL SOCIETY

DR. C. F. BEESON ..... Roswell
DR. H. A. MILLER ..... Clovis

MEDICAL & SURGICAL ASSOCIATION OF THE SOUTHWEST
(Publication Committee)

DR. WILLIS W. WAITE ..... El Paso
DR. E. PAYNE PALMER ..... Phoenix
DR. P. G. CORNISH, Jr. ..... Albuquerque

PRESIDENT'S ADDRESS

President Clarence Gunter's address which was published in the June issue of this journal called attention to a number of points which the profession of this state should hold constantly in mind.

The first is relative to Arizona's being the natural play ground of the United States and an all round resort for pleasure and health. By advertising our advantages to the people of the United States we shall be assured of prosperity which can not be taken from us. The medical men should see to it that the respective chambers of commerce are fully aware of the profits to be made by advertising our state as a play ground and health resort. Any benefits which accrue to one part of the state must be reflected upon every other. The Phoenix newspapers carried the statement that 20,000 persons from the Salt River Valley motored to the northern part of the state during the 4th of July holidays. This did not mean that many of them did not go to the southern or eastern parts of the state. There might well be a state chamber of commerce for the purpose of advertising the entire state as a unit.

The president next called attention to the effort being made by certain insurance companies to lower the fee schedule of the Industrial Commission. He points out that if the men would be conscientious in their reports and in their attention to patients, making no unnecessary calls or charges, that the Industrial Commission very likely will make no alteration of the schedule. It is difficult to believe that any member of our profession would make the Industrial Commission an unjust charge. If such there are examples should be made of them. Such practices must be stopped!

The next point which he discussed is that of putting occupational diseases in the same class as Industrial accidents, allowing them to be taken care of by the Industrial Commission. This would seem to be just.

He recommends that the question of contract practice be brought to the consideration of the council of the Arizona Medical Association to be thoroughly discussed that a proper stand may be taken upon it.

He next calls attention to the cults and irregular practitioners which are flocking into this state in large numbers and suggests as a remedy that we again attempt to pass the Basic Science act. He emphasizes the importance of the physician's taking an active part in politics and making sure that every man running for the legislature will endorse this act and such other acts for the good of the public that are put forth by the medical profession.

His last subject to be thoroughly discussed was that of medical ethics. While our ethics are misunderstood by the public at large there is no question but what our code does much for the public as well as for ourselves.

PUBLIC HEALTH NOTES

By J. ROSSLYN EARP, Dr. P. H.
Director New Mexico State Bureau
of Public Health.

NATIONAL TUBERCULOSIS ASSOCIATION

Many physicians from the Southwest and from Colorado were present this year at the meeting of the National Tuberculosis Association which was held at Colorado Springs from June 6 to 9. At a luncheon held on June 8th and attended by repre-

sentatives from the Rocky Mountain states it was decided to form a regional Tuberculosis Association without any dues or binding rules. Dr. Chas. O. Giese of Colorado Springs was elected president, Dr. L. S. Peters of Albuquerque, vice president, and Dr. Arnold Minnig of Denver, secretary. These officers are to consult with people actively interested in tuberculosis and to decide upon the date and place of the first meeting.

An excellent symposium was presented in the sociological section on tuberculosis amongst Indians, negroes and the Spanish Americans. Dr. Robert O. Brown of Santa Fe represented this section of the country with a paper which followed the social life of the New Mexican natives from the time of the Conquistadores down to the present.

A most refreshing paper was that of Dr. Mazyck P. Ravenel, editor of the American Journal of Public Health, who made a special effort to relieve the association of any false pride that they may have assumed. Younger members got quite an historical thrill from reenacting with Dr. Ravenel his single handed fight in this county at the beginning of the present century against the famous Koch heresy that human beings cannot contract an infection with the bovine bacillus.

WESTERN BRANCH AMERICAN PUBLIC HEALTH ASSOCIATION

Close upon the heels of the meeting in Colorado Springs came a convention in Denver of the Western Branch of the American Public Health Association. State health officers from Washington, Oregon, California, Montana, Idaho, Utah, Colorado and New Mexico were present. Doctor Sult of Arizona was officially represented by Mrs. Leeper. An excellent program included two addresses by Dr. Louis I. Dublin, from weekly reports on the health of twenty-six million policy holders of the Metropolitan Life Insurance Company, could report that up to the present, in spite of economic conditions. there is "not a trace" of disturbance in the health of the people. On the other hand he strenuously maintained that to cut budgets for health departments at the present time is "like disbanding an army in time of war."

In the secretary's report New Mexico won its share of praise by having contributed the largest number of new members in the last twelve months. Dr. C. H. Douthirt of Union County and Dr. Walter E. Kaser of San Miguel County were among the delegates present.

Many excellent papers were read and the discussion was lively and a source of constant anxiety to timekeeping chairmen. These papers will be published, some in the American Journal of Public Health, others in western journals such as Western Hospital Review. Dr. A. L. Beaghler of Denver was elected president and Dr. J. L Pomeroy of Los Angeles, president elect. It was decided that the 1933 meeting shall be held "somewhere in southern California."

INTRAVENOUS UROGRAPHY

(Continued from page 301)

resistance over the latter area, although a mass could not be definitely outlined.

X-ray examination of the chest was negative. Roentgenograms of the kidneys revealed moderate uniform enlargement of the left kidney; the right one was not visualized. However, while the lateral margin of the left psoas muscle was well defined, that on the right was very faintly visualized and appeared compressed medially. The lumbar spine was flexed to the left; diagnosis of probable perinephritic abscess was made.

Cystoscopy was performed, but, because of intense inflammation, the ureters could not be located. As we had administered uroselectan in three cases previously in our series without untoward effects, and as the diagnosis was still in some doubt, this procedure was thought to be indicated. Therefore, we injected two-thirds of the normal dose of uroselectan at 2 p. m. Forty-five minutes later the patient had a severe chill, and the temperature rose to 105°; pulse 160 and weak. At the same time he became wholly incoherent. At 3 p. m. a roentgenogram disclosed the presence of a little of the opaque drug in the bladder, but its concentration was insufficient to produce a pyelogram. A blood count showed red cells, 4,510,000; white blood cells, 18,475; hemoglobin, 75 per cent. No urine was secured because of the incontinence. The patient lapsed into unconsciousness at 5 p. m. As it was feared that he would not react, he was operated upon at 7 p. m. An incision in the lumbar region over the right kidney disclosed an abscess containing two liters of thick pus, superficial to the muscles. An incision released another liter from the region of the left midaxillary line. At 11 p. m. the temperature reached 107.8°, with no pulse. At 2 a. m. the patient died.

No doubt this patient was very septic before the uroselectan injection, as shown by the fact that three liters of pus was obtained from two incisions. He was in a critical condition at the time the two large abscesses were incised. The operation was five hours after the uroselectan administration, and death of the patient twelve hours after the injection. I am of the opinion that uroselectan played very little part in this patient's death.

Some few urologists have voiced themselves as definitely antagonistic to intravenous pyelography. Perhaps they are of the opinion that this procedure

will take urography out of the hands of the urologist, and place it in the hands of the general practitioner, but such is not the case. On the other hand it will bring many cases to the urologist to clear up questionable urological conditions that would otherwise go totally undiagnosed.

Again I will state that a pyelogram by the intravenous method can not be compared with one by the catheter method, all other things being equal.

It is not so much the question which is the better method, as it is to make the proper selection of cases in which to use either method or both.

Retrograde pyelography is not to be supplanted by, but supplemented with, excretion urography. Each has its advantages and disadvantages.

There is much danger of becoming overenthusiastic about this procedure, thus retarding its development because of unsatisfactory results in unselected cases. It is not a short cut to diagnosis, nor an all around diagnostic procedure. It is only one of the "modi operandi" of urological diagnosis.

Excretion urography is here to stay. It is an advance in special and routine urologic studies.

GRANT COUNTY (N.M.) MEDICAL SOCIETY

Under the guidance of the President, Dr. William Washburn, and with the able assistance of Dr. David Kramer of the Program Committee, the Grant County Medical Society has recently enjoyed a series of three unusually interesting and successful meetings. These meetings have been made possible by the friendly cooperation and interest of a number of El Paso physicians and the Society is greatly indebted to these men for their assistance and kindness.

On March 25th, Dr. L. O. Dutton of El Paso presented a paper on "The Present Status of Allergic Diseases," discussing the mechanism of protein sensitivity, symptoms and treatment. Dr. Dutton stated that he felt that a certain degree of disrepute into which, in some quarters, protein disensitization had fallen was due to two factors, the overenthusiasm of some of its proponents and carelessness in administration and technique on the part of others. Dr. Byrne of Fort Bayard presented a clinical report on "Spleno-Myelogenous Leukemia," the patient being present for demonstration and exhibiting a markedly enlarged spleen extending into the pelvis. In the discussion which followed, Dr. Cathcart of El Paso stressed the remarkable remissions obtainable by judicious x-ray treatment.

On April 29th, a dinner meeting was held at the Silver Inn, Silver City. After an enjoyable repast the first of the guest speakers, Dr. S. A. Schuster of El Paso, spoke on "The Larynx in the Tuberculous," taking up the differential diagnsois, complications, and treatment of the condition and illustrating his points with the histories of actual cases from his experience. Dr. N. H. Keller of El Paso followed with a paper on "The Pathologic Physiology of Nephritis," presenting a simplified clinical classification and thoroughly evaluating the various factors in diagnosis, including laboratory tests. Dr. Arthur E. Gill of Fort Bayard presented a paper on "Ocular Tuberculosis.' Dr. Gill reviewed the experimental work in this field and illustrated his talk with original water-color representations of the eyeground in this condition.

On May 25th, the Society had as guest speakers Drs. J. M. Laws and C. F. Rennick of El Paso. Dr. Laws presented a most instructive paper on "Clinical Reports of Difficult Chest Cases," the paper being illustrated with lantern slides and x-ray films. Dr. Laws discussed a number of the puzzling border-line chest cases, in which the decision of what to do depends so heavily on the personal judgment and experience of the physician, there being little guidance in the text-books. Dr. Rennick talked on "Infant Feeding in the First Trimester," stressing the great importance of even a small proportion of breast milk in the cases where artificial feeding must supplement the natural method and taking up the routine of breast feeding in detail with description of cases in point.

The Society has been fortunate in having the valuable cooperation of Dr. W. E. Park, the Commanding Officer at the Veterans' Bureau Hospital at Fort Bayard, N. M. Dr. Park has given much impetus to the successful functioning of the Society. The meeting place, The Officers' Club at Fort Bayard, is well equipped for the presentation of material, an excellent lantern and reflectoscope, stereoscope, and examining tables being at the disposal of members: further, the Veterans' Hospital affords a wealth of clinical material and the facilities of a well equipped laboratory for the study of these cases. It is hoped that the coming meetings of next fall and winter will set the same high mark as those recently held.

GOOD SAMARITAN HOSPITAL (Phoenix, Ariz.)

STAFF MEETING, MARCH, 1932

REPORT OF DEATHS FOR JANUARY AND FEBRUARY, 1932.

There were twenty-two deaths in the hospital during the months of January and February, but only three autopsies. This makes the low percentage of 13.6 for autopsies. I believe that, if the relatives were properly approached on the matter, it should be possible to obtain autopsies in over 50 per cent of the deaths.

I have attempted to group the cases roughly as to diseases. There were five cases of pneumonia; four of these were in the hospital one day. This in it-

ELI LILLY AND COMPANY

FOUNDED 1876

Makers of Medicinal Products for Use Exclusively Under Professional Direction

MERTHIOLATE

An organic mercurial germicide distinctive for its combined germicidal value and tissue compatibility. Supplied in a variety of convenient forms.

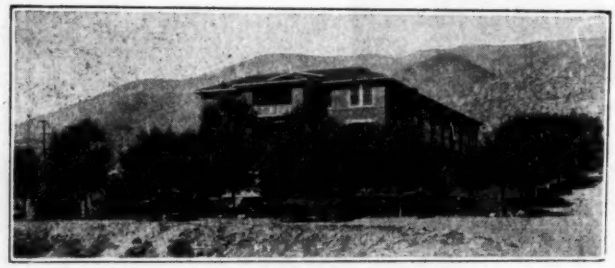
Prompt Attention Given to Physicians' Inquirie.

Address Principal Offices and Laboratories, Indianapolis

self either reflects the general financial depression or suggests that the hospital, instead of being used as a valuable workshop in which to treat disease, is sometimes regarded as a last desperate resort for the moribund patient. There were four cases of pulmonary tuberculosis; two of these died shortly after a thoracoplasty. There was one case of tuberculous meningitis, one death following an operation for gangrenous appendix, and one of acute hemorrhagic nephritis. This brings the total of acute infections to fourteen. Of the remainder, there were four deaths from accidents, two from chronic myocarditis, one from carcinoma, and one from a possble mediastinal or lung tumor. The shortest stay in the hospital was a few hours, the longest for the carcinoma of the breast, 10 months. There were twelve cases who were in the hospital two days or less, before death.

The records on the whole are not sati factory. The histories are too brief and the physical examinations incomplete. In reaching the proper diagnosis in a given disease, it is essential to have a clear picture of all the possible circumstances involved, otherwise obviously there will be many mistakes made and many conditions of prime importance will be overlooked. The practising physician may say that it is possible to obtain a complete history and yet only record the essentials. Unfortunately, this is not always possible, because details which are at the time made light of, may later be of prime importance. It is not necessary for a history or physical examination to be written at great length, but it should be systematic and complete.

The importance of an adequate history is illustrated by case 13306. This patient, a woman aged 38, was admitted to the hospital twice, the first time, December 18, 1931. She was discharged four days later. She gave the history of having been scratched in the right arm a few days previously, while working in the laboratory. Very shortly, swelling and redness of the right arm set in. This is as far as the history goes. In the physical examination, a brief description is made of the swelling. The nurse's notes mention local applications with improvement of the condition. There is no reference made at any time of any operation, or even indications for an operation, yet, on the front page it states that there was incision and drainage of the arm. The patient was discharged apparently recovered. She was readmitted on the 25th of January, over a month later. The history on this admissoin states briefly that she did not feel well a few days before admission and that three days previously she had had a chill and began running fever. She soon began having pain and swelling of the right knee and pain in the left chest. No mention is made of the discharging sinus of the right arm. The physical examination, on the other hand, is somewhat better than the average. It states, among other things, that there is dullness to per-



THE LONG SANATORIUM
EL PASO, TEXAS.

Modernly equipped for the care and treatment of tuberculosis in all stages. Rates $20.00 per week and up. Nurses care and medical attention included. Write for descriptive booklet.

A. D. LONG, M. D.,
Medical Director

POSTGRADUATE SCHOOL OF SURGICAL TECHNIQUE, Inc.
2512 Prairie Avenue (opposite Mercy Hospital) Chicago, Illinois

1. General Surgery: 100 hours (2 weeks) course of intensive instruction and practice in surgical technique combined with clinical demonstrations (for practicing surgeons)
2. General Surgery and Specialties: Three months' course comprising: (a) review in anatomy and pathology; (b) demonstration and practice in surgical technique; (c) clinical instruction by faculty members in various hospitals, stressing diagnosis, operative technique and surgical pathology.
3. Special Courses: Orthopedic and Traumatic surgery; gynecology and radiation therapy; eye, ear, nose and throat, thoracic, genito-urinary and goiter surgery; bronchoscopy, etc.

All courses continuous throughout the year. Detailed information furnished on request.

cussion at the left base, rigidity and tenderness of the abdomen, some tenderness but no swelling of the right knee, and a discharging sinus above the right elbow. In other words, no apparent importance was attached to the original infection of the arm as a possible source for the blood stream infection. No mention is made as to whether or not this sinus had been draining ever since the original operation, though I assume that it had. X-rays were taken, but not of the arm. Is it not likely that an osteomyelitis of the humerus initiated the septicemia, and that operative measures to eliminate this source of infection might have been life saving? Would not a careful history, complete physical examination, and adequate follow-up notes be more likely to place the sequence of events and to focus attention in the proper place? In the follow-up notes, very little is said of the condition of the left lung, and yet autopsy revealed an empyema Nothing was done to treat this condition. Even in the autopsy report, only brief mention is made of the wound above the right elbow. Surely this should have been investigated more thoroughly.

Another excellent example of the importance of good records is case 13374. This patient, a man of 72, was admitted to the hospital on two occasions, the first time in February, 1926. He remained in the hospital 25 days. The history is very brief and inadequate. It states that he had frequency of urination for three years, with pain upon voiding, and that for two days previous to admission, he had been unable to void. The physical examination states that everything is negative except for an enlarged prostate. In spite of this, there is mention made in the nurse's notes of great difficulty in breathing on several occasions. During his stay in the hospital, he received frequent bladder irrigations. He was again admitted on the first of February, 1932, six years after the previous admission, and died 25 days later. The second history states that the patient had been short of breath for the first time during his previous admission, and then follow two paragraphs of what the nurse's notes had to say on the subject at that time. This history is brief and incomplete, it leaves the impression that the physician who was caring for the patient six years previously had not been thorough. Yet, on this last admission, though there is a fairly good physical examination, with obvious findings of chronic cardiac disease, no rectal was recorded and no mention is made of the urinary history. The follow-up notes also neglect the matter. This oversight is important, because it is possible that an enlarged prostate with urinary obstruction might have been partly responsible for the circulatory defects, through renal damage incurred by pressure. Moreover, no studies were made of renal function, the urine was examined only once, and the fluid intake and output was not measured. Is it not possible that, if there had been urinary obstruction, the institution of adequate drainage might have prolonged the patient's life? At any rate, the defects of these histories leave much to idle specula-

10 YEARS

Our first announcement of S. M. A.

of PREVENTIVE INFANT FEEDING

In November, 1921, the S.M.A. Corporation announced an epochal development in The Journal of the American Medical Association.

This development was called S.M.A. and resembled breast milk so closely that about 95% of infants deprived of breast milk would do well on it. It was a departure particularly in its preparation of the fats, and it also was a departure because it included enough cod liver oil to be antirachitic.

In offering S.M.A. to the medical profession, S.M.A. Corporation was the first company to recognize the importance of the antirachitic factor by including it in the fat, giving automatic protection. S.M.A. is *still* the *only antirachitic breast milk adaptation.*

The excellent results produced by intelligent feeding of S.M.A. created such a demand that its use is general all over the United States and in many foreign countries.

More than 3 hundred million feedings of S.M.A. have been prescribed by physicians.

A TRIAL SUPPLY of S.M.A. with complete feeding suggestions will be sent to physicians upon request. Infant Record Sheets and weight charts will be included if you say so.

What Is S.M.A.?

S.M.A. is a food for infants—derived from tuberculin tested cows' milk, the fat of which is replaced by animal and vegetable fats including biologically tested cod liver oil; with the addition of milk sugar, potassium chloride and salts; altogether forming an antirachitic food. When diluted according to directions, it is essentially similar to human milk in percentages of protein, fat, carbohydrates and ash, in chemical constants of the fat and in physical properties.

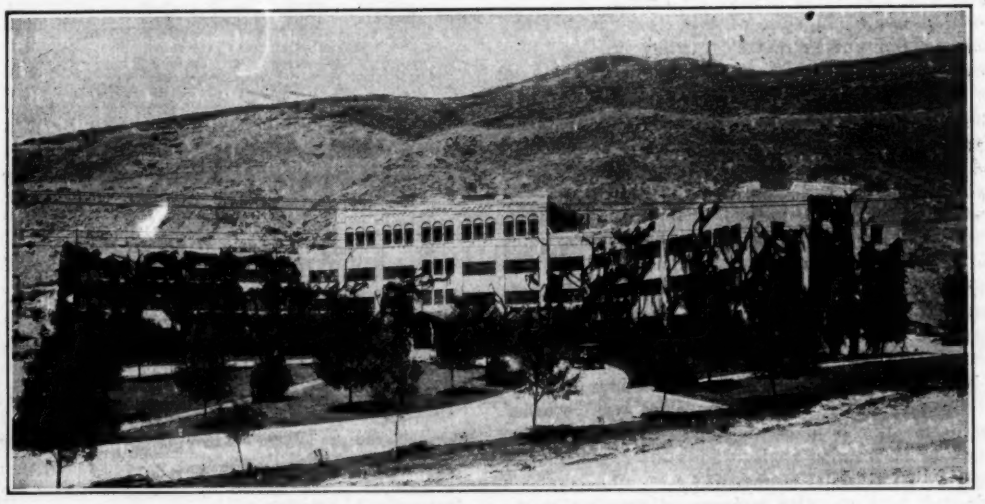
S. M. A.
West Coast Co.
437-8-9 Phelan Building
San Francisco, California

COPYRIGHT 1932, S.M.A. CORPORATION

(Attach this line to your prescription blank or letterhead). 46-42

tion. It is interesting that, in this case, no attempt was made to give this patient adequate digitalis therapy. On the first day of his admission, he was given five doses of the tincture of strophanthus (6 minims) and two doses of the same amount on each day for two succeeding days, then the medication was dropped and digitalis by hypo was again resumed, only a week before death. Digitalis will not always benefit a patient with a decompensated heart, but it never will unless given in adequate doses. Nor is it possible to foresee what effects it will have in a given case until it is properly tried. Strophanthus, or tincture of strophanthus, should not be used in the place of digitalis, because its absorption is very irregular. On the other hand, strophanthin is still used intravenously because of its rapid action. This record illustrates the importance of thoroughness in the obtaining of a history and the performing of a physical examination. Because of its shortcomings it is valueless as a record for statistical studies.

Case 13515, on the other hand, illustrates that thoroughness alone is not sufficient in the study and care of a patient, but that it is equally important to be familiar with the principles of disease and its treatment. This patient was a decompensated cardiac a year ago. At that time, he was markedly dyspneic and orthopneic; his heart was enlarged, had a double murmur at the apex, and was fibrillating. There was a pulse deficit of 24, the apex beat being 104 and the radial rate 80. He was given 4½ grs. of digitalis a day, for a week, with striking improvement. His dose was then gradually reduced until a maintenance dose of 18 grs. a week were prescribed. He continued to do well for four months and on this allotment of digitalis was able to go back to work. But he was then lost track of until he was admitted to the hospital with pneumonia. The history taken in the hospital is very complete, but, curiously enough, no mention is made as to whether or not the patient had continued to take digitalis up to the time of his present illness. The physical examination is also complete, with diagnosis of right lower lobe pnuemonia. Here again, though the heart is carefully described, no mention is made of the rate, nor of a possible pulse deficit. These are serious oversights, because they are points which should have been considered in the attempt to throw some light on the proper treatment. This patient was in the hospital one day before he died. During that time, he was given caffeine sodium benzoate, which could do him no harm, and adrenalin, which might throw an added burden on the already overtaxed heart. But he was given no digitalis and, moreover, was given an intravenous infusion of 1000 cc. of glucose and saline. It would have been far better to relieve the congestion by phlebotomy than to add to the already everburdened heart in this way. Glucose is often valuable in congestive heart failure, but only when it is given in concentrated small amounts, very slowly. If this patient had not been receiving digitalis,



THE HOMAN SANATORIUM

For the Treatment of Tuberculosis

EL PASO, TEXAS

A privately owned, thoroughly and modernly equipped, ethical institution of 110 rooms. Heliotherapy, pneumothorax, phrenic nerve and chest surgery, and all other modern methods of treatment.

Write for booklet giving rates and other information.

NEW LOW PRICES ON NEO-ARSPHENAMINE

Product of DIARSENOL CO., Inc., LABORATORIES (Est. 1914)

Largest Exclusive Manufacturers of Arsphenamines in the World

Size Ampoules	Unit Price	Physicians Wholesale Prices
0.9 Gram	$0.80 Per Ampoule	$5.00 Per Box of 10 Ampoules
0.6 Gram	0.60 Per Ampoule	4.50 Per Box of 10 Ampoules
0.45 Gram	0.50 Per Ampoule	4.00 Per Box of 10 Ampoules
0.3 Gram	0.40 Per Ampoule	3.50 Per Box of 10 Ampoules
Double Distilled Water	Size 10 c. c.	$1.00 Per Box of 10 Ampoules

COLLOIDAL MERCURY SULPHIDE, HILLE—60 c. c. vial—$3.00

Prepared under regulations issued by the Federal Trade Commission and conforms with tests approved by the U. S. Public Health Service. Accepted by the A. M. A.

Unsurpassed in Therapeutic Efficiency and Uniformity.
This superior product is satisfactory in respect to low Toxicity and Solubility.
Special Discount on large orders. Goods shipped on receipt of price or C. O. D.

Park Bishop & Company

ESTABLISHED 1929

SOUTHWESTERN DISTRIBUTORS

P. O. Box 1461 **El Paso, Texas**

Available in El Paso at Drs. Cathcart, Mason and Dutton Laboratories, 310 Roberts-Banner Bldg.

This Needle Does Not Have to be Wired

Accept this TRIAL OFFER

Here is a hypodermic needle that does not clog or corrode; one that is impervious to acids and reagents; a needle that does not have to be wired or even dried after cleansing. . . . . one that remains sharp indefinitely.

The name is VIM—the needle with the Square Hub.

If you are about to buy needles we invite you to try VIM. Accept this offer. Just check and mail the coupon to us.

Southwestern Surgical Supply Company

311 Mills Street
El Paso, Texas

No. 121 North First Street
Phoenix, Arizona

Gentlemen: Send me a trial dozen of VIM Hypodermic Needles as checked below. If these needles do not prove all you claim them to be they may be returned and the charge cancelled.

.....27 G. ½" .....@ $2.50 doz.	.....26 G. ½" .....@ $2.50 doz.	.....25 G. ⅝" .....@ $2.50 doz.
.....24 G. ¾" .....@ $2.50. doz.	.....23 G. 1" .....@ $2.50 doz.	.....23 G. ⅝" .....@ $2.50 doz.
.....22 G. 1⅛" .....@ $3.00 doz.	.....20 G. 1½" .....@ $3.00 doz.	

Name..... Address.....

he should have been promptly digitalized by Egelson's rapid method. It would have been necessary, in all probability, to give him the proper amount by hypodermic; partly intramuscularly and partly intravenously.

Case 12633 is another incomplete record, but this patient illustrates strikingly the failure of inadequate digitalis therapy. She was an old woman of 82, admitted with congestive heart failure, probably arteriosclerotic in origin. She had a marked general anasarca. Immediately upon admission, she was given massive doses of the tincture of digitalis, with striking improvement. Dram doses were given at four-hour intervals, for four doses, then 15 minims three times a day. But in a month, the digitalis was discontinued for two weeks and then resumed only in a very sketchy manner. Naturally, all the symptoms of decompensation set in again, including the edema. This patient, once digitalized, should have been given a daily maintenanc edose of from one to two cat units a day or of about 15 to 30 minims of a potent tincture. If, in spite of this treatment, she continued to show symptoms of decompensation, with edema, she should have been placed on a low fluid intake. There was a restriction of salt. The diuretics of most value in combating cardiac edema are theocin and salergen with ammonium chloride.

These cases illustrate the importance of good case records. On the one hand, there are records which are short and totally inadequate; on the other, there are long-winded documents which give a mass of detail and still miss the important points. It is obvious that training is required for the proper taking of a history, just as it is for the proper taking of a physical examination. Hence, both should be in the hands of a physician or intern in charge of the case. In many hospitals a course in history taking is given to the interns, and, to serve as a guide, an outline is provided; no history is considered adequate which does not meet the requirements of this outline. It is interesting what important information can be obtained from the history alone. Patients often apply to the physician for some relatively insignificant condition, and careful questioning may reveal some far more important disease, which, unlooked for, might very easily be missed. For the same reason, no physical examination should be considered complete which omits systematic investigations. I believe that the histories and physical examinations are equally important, and that care in taking them often makes extensive laboratory and x-ray studies unnecessary.

In conclusion, I should like to suggest that it might be of value in the report of the deaths, if each physician in charge of an interesting case were given the privilege of discussing his case. In this manner, some interesting information might be gained that is not in evidence in the records. Of course, my criticisms are entirely based on the information obtained from the written records, and the physician in charge of the case might have some data which would make the criticisms without merit. But, for this very reason, let it be emphasized that, in order to obviate misunderstandings, complete records should be kept.

LOUIS B. BALDWIN.

BOOK REVIEWS

SURGICAL PATHOLOGY OF THE SKIN, FASCIA, MUSCLES, TENDONS, BLOOD AND LYMPH VESSELS, by Arthur E. Hertzler, M. D., Sugreon to the Agnes Hertzler Memorial Hospital, Halstead, Kansas; Professor of Surgery, University of Kansas. Philadelphia, Montreal and London; J. B. Lippincott Company; $5.00.

A monograph of surgical pathology of skin,

Samples and literature on request.

A FOOD WHICH CORRECTS INTESTINAL PUTREFACTION

LACTO-DEXTRIN
(Lactose 73% — dextrine 25%)

Provides the right soil for the growth of a normal intestinal flora — Nature's method of combating putrefaction.

THE BATTLE CREEK FOOD CO.
Battle Creek, Michigan

Founded 1896 by Dr. Hubert Work

WOODCROFT HOSPITAL, PUEBLO, COLORADO

A modern, newly constructed sanitarium for the scientific care and treatment of those nervously and mentally ill, the senile and drug addicts.

CRUM EPLER, M. D.
Superintendent

fascia, muscles, tendons, and blood and lymph vessels, in which both clinical and pathologic aspects are set forth, is a monumental task for any one ordinary man. Hertzler is more than ordinary. He has already presented a monograph on surgical pathology of the disease of the bones. In preparation are four other monographs: on the genito-urinary organs, the female generative organs, the gastro-intestinal tract and the peritoneum. Four more are to follow, on the mammary gland, diseases of the neck, diseases of the mouth and jaw, and diseases of the thyroid.

The present volume contains 301 pages, with 260 illustrations. The work is encyclopedic in type and all but defies a review of it.

The book is divided into three parts, devoted to skin, fascia, muscles and tendons, and blood and lymph vessels. There are ten chapters.

Superficially reviewing part I: There are five chapters dealing with ulcers of the skin, benign epithelial tumors, malignant epithelial tumors, fibrosis tumors, and melanomas. There are 153 pages and 142 illustrations.

Again, superficially taking up Chapter One: The author defines the term ulcer; devotes a paragraph to "why ulcers do not heal"; then he gives a general and special consideration of ulcer causes, the nature of the tissue in which ulcers occur, anomalies of the circulation, disturbances of intervention, local irritation, size and form of the ulcer, nature of the base of the ulcer, hyperplasia of epithelium about the border of the ulcer, classification of ulcers. After this he discusses ulcers of nonspecific and specific etiology.

He apparently has covered the subject. At the end of each chapter is a short but excellent bibliography.

The typographical work and the illustrations are excellent, and a credit to the publishers. This should be a popular reference work. O. H. B.

HEALTH PROTECTION FOR THE PRESCHOOL CHILD. This report was made to the White House Conference on Child Health and Protection by George Truman Palmer, Dr. P. H. Matthew Derryberry and Philip Van Ingen, M. D.

The report is an attempt to answer the question of how well the health of the sixteen million children in the United States is protected. Three-fourths of the cities of 50,000 population and rural areas of forty-two states were investigated, resulting in a most graphic and painstaking report. The book is divided into four parts: (1) General preventive measures; (2) Results of a survey in 156 cities and in rural areas of 42 states; (3) Statistical tables; (4) Method of administraiton of survey. The whole makes a reliable, comprehensive, and readable survey of a topic of interest to physician and parents alike.

T. G. B.

NEW---GREATER ALOE CATALOG

. . . . your for the asking!

LOWEST PRICES IN HISTORY

on

Surgical Instruments

Equipment and Supplies

448 Pages!

Contains listings of your every want at LOWEST PRICES IN HISTORY! Thousands of items: Aseptic Steel Furniture in your choice of colors, Reception Room Furniture, Physical Therapy Apparatus, Chrome Plated Instruments, Diagnostic Instruments and Apparatus, Laboratory Apparatus, Supplies, Orthopedic Supplies, etc. Everything for a distinctive armamentarium. Just mail us your name and address. It's FREE. No obligation.

A. S. ALOE CO.

932 S. HILL STREET LOS ANGELES, CAL.

One of a series of advertisements in *The Saturday Evening Post*, the *Literary Digest*, and other national magazines, setting forth some of the accomplishments of Medical Science in the diagnosis, treatment, and prevention of disease. *Parke, Davis & Co.*

What your Doctor hears

HAVE YOU ever watched your physician use his stethoscope?

What a simple operation it seems. But what an amazingly complicated and vital operation it really *is!* He is listening to the life-sounds of your body.

Your own ears might detect some of these sounds, but only a doctor's ears, made super-sensitive by years of training and experience, can hear them all and accurately interpret their meaning.

For years your doctor has studied the action and texture of internal organs and tissues. He is so expert in the science of chest-acoustics that he can detect inflammation or any other unusual condition in the bronchial tubes by the delicate shades of musical pitch caused by the passage of the air from the throat to the lungs. He can hear the sounds of moisture in the air-sacs which say, "pneumonia"; the roughness of an inflamed pleura which suggests pleurisy; the defective closing of valves symptomatic of heart disease.

And when he takes your temperature or blood-pressure, when he examines your nose and throat and ears, when his skilful, gentle fingers search for a tender spot in your abdomen —when he does all these things, he is employing scientific methods whose usefulness in revealing your body's secrets has been developed by decades of study and experience. But only the trained eye and ear and hand of your physician can *use* them scientifically.

Your doctor is trained to recognize and cure disease. Make use of his experience and ability. Far too many people suffer needlessly as the result of well-intentioned but unscientific advice of friends and neighbors. When you feel ill, get *professional* advice—call your doctor without undue delay.

PARKE, DAVIS & COMPANY

The World's Largest Makers of Pharmaceutical and Biological Products